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ARMY ALT



Army Recapitalization



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FROM THE ARMY ACQUISITION EXECUTIVE

Paving The Path To A Successful Future

During my tenure, I have often said that my job is to make sure that soldiers have the equipment and supplies they need to get to the fight quickly, win decisively, and come back alive. It is an awesome responsibility that I share with LTG Paul J. Kern and LTG Peter M. Cuvillo, my military deputies. We are privileged to work with an outstanding, results-oriented team comprising program executive officers; program, product, and project managers; and some of the best and brightest military and civilian personnel in government today. Our team is hard working and very busy. With the Army's transformation strategy moving forward along three major paths—the legacy force, the interim force, and the objective force—the Army's acquisition, logistics, and technology team has a critically important role in each path, and is meeting every challenge with success. We have put programs in place to recapitalize the legacy force, acquire an Interim Armored Vehicle (IAV) for the interim force, and identify potential technologies for the Future Combat Systems, the centerpiece of the objective force.

This issue of *Army AL&T* is devoted to recapitalization. It is the first step in the Army's transformation process. It is also a pivotal one. If we do not update and improve our currently fielded weapons, these aging systems will mean a future of escalating operating and support costs and declining readiness rates. The articles in this issue will provide a better understanding of the importance of recapitalization. Even though we will be taking fielded systems away from our soldiers for a period of time, they will be returned to them better than new.

The second step in the transformation process will lead us to the interim force. Here, too, we are making significant progress. This past November, LTG Kern and I were pleased to brief members of the media on the Army's award of the IAV contract. This marked a major milestone in the Army's transformation process and a victory for acquisition and logistics reform. In the past, a source selection of this magnitude took up to 3 years. The IAV award took just over 1 year, and the clear winners are America's soldiers because this family of vehicles will provide them with world-class, off-the-shelf equipment.

Equipping the Army's six interim brigade combat teams with IAVs will accomplish two goals. First, it will increase the Army's ability to deploy forces rapidly worldwide. IAVs are C-130 transportable, which will enable our troops to get to the fight fast and operate with a much smaller logistics footprint. Second, the IAV's speed, mobility, and armor protection will increase lethality and enhance soldier survivability.

The IAV will be manufactured in two major variants—the Infantry Carrier Vehicle and the Mobile Gun System. Eight differ-



ent configurations of the Infantry Carrier will be used as reconnaissance vehicles; mortar carriers; command vehicles; anti-tank guided missile vehicles; fire support vehicles; engineer support vehicles; medical evacuation vehicles; and nuclear, biological and chemical reconnaissance vehicles. The Mobile Gun System is equipped with a 105mm cannon, the same gun tube as the one on the original M1 Abrams tank.

The IAV has all-around armor protection that will withstand rounds from a 50-caliber gun and protect the crewmen against 152mm artillery airbursts. There is additional protection in its speed. IAV has a top speed of 60 mph and a convoy speed of about 40 mph. To increase mobility, the tires can be inflated or deflated from inside the vehicle to make it highly effective on different surfaces ranging from mud to hard-road surfaces to sand. There is a built-in fire suppression system and a self-recovery winch in case the vehicle becomes stuck in muddy or slippery terrain.

Additionally, the IAV will significantly reduce the Army's logistics footprint. Eighty-five percent of the parts are common among the vehicles, including an engine that is already in the Army inventory (the same one found in the Family of Medium Tactical Vehicles). The IAV will also exceed reliability requirements for all variants and configurations, with greater than 1,000 mean miles between critical mission failures. Both commonality and reliability will relieve the logistics burden.

IAV also has superior fuel efficiency, which will further reduce the logistics burden. What will reduced fuel requirements mean to the overall force? Think, for a moment, about what it takes to support the force. You need fuel. You need trucks to deliver the fuel. You need mechanics and drivers for those trucks. You need cooks and medics for the mechanics and drivers. Now what happens if you significantly reduce the fuel requirement? Less fuel means fewer fuel trucks; fewer fuel trucks mean fewer drivers and mechanics; fewer drivers and mechanics mean fewer cooks and medics; fewer cooks and medics mean fewer supply trucks, and the process continues.

With the IAV, the big winner is the American soldier. We will provide him with world-class equipment to get to the fight fast, win decisively, and come back alive. With IAV and a new operational and organizational structure, the interim force will begin to take on some objective force characteristics—those that are available within the constraints of current technology. This will help pave the way for the technologically advanced, highly mobile, and flexible Future Combat Systems, the third step in the Army's transformation process. We are making great progress.

Paul J. Hoyer

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By order of the Secretary of the Army

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COVER

The Army is selectively rebuilding and upgrading its aging equipment to ensure it is operationally ready. Army depots, in partnership with industry, play a key role in this effort.

RECAPITALIZATION: A KEY ELEMENT OF THE ARMY TRANSFORMATION

Eric A. Orsini and COL Glenn J. Harrold

"The Department of Defense continues to face a limited investment budget constrained by a relatively stable top-line budget, and squeezed by increased operations and support costs for aging weapons systems."

—Jacques S. Gansler, The Road Ahead

Introduction

If COL Harrold's 15-month-old son chooses to serve in the U.S. Army, he will probably be a platoon leader around the year 2020. The soldiers in his platoon will have been motivated to join the Army through interactive recruiting advertisements showing future soldiers using weapon systems from the objective force.

In reality, their motor pools and storage sites will mostly contain weapon systems and equipment we use today. His platoon's ability to train for, fight, and win a war depends on how well we succeed with one of the many challenges we face today: ensuring that the weapons and equipment will be available and usable for those soldiers who must win that future war.

The Army's aging equipment results in lower readiness rates and higher operations and sustainment costs. Twelve of the 16 critical weapon systems briefed to the Army Chief of Staff each month exceed the targeted fleet average age. One of the key solutions to this problem is recapitalization.

A relatively new term, recapitalization involves rebuilding and selectively

Army Recapitalization Program

Policy

- "Recapitalization of fielded systems is central to both *readiness* and the Army's transformation. Implementing recapitalization . . . will provide the *warfighter* with a *more capable, reliable, and economically sustainable weapon system* . . . It is essential that we share a common understanding of program objectives and *synchronize our modernization and sustainment efforts* . . ."

Execution Responsibilities

- "The *Army Materiel Command*, in full partnership with *Program Executive Officers and the MACOMs*, will take the lead in establishing processes and procedures for *initiating and executing recapitalization programs* . . .

Oversight Responsibilities

- "The *Vice Chief of Staff and Assistant Secretary of the Army for Acquisition, Logistics, and Technology* will jointly chair an *Army-level review of the recapitalization effort annually*."

Army Recapitalization Program *Definitions*

- **Modernization:** *The development and/or procurement of new systems with improved warfighting capabilities.*
- **Recapitalization:** *The rebuild and selected upgrade of currently fielded systems to ensure operational readiness and a zero-time/zero-mile system.*
 - **Rebuild:** *Restores systems to a like-new condition in appearance, performance, and life expectancy; inserts new technology to improve reliability and maintainability.*
 - **Upgrade:** *Rebuilds system AND adds warfighting capability improvements to address capability shortcomings.*
- **Maintain:** *Repair or replacement of end items, parts, assemblies, and subassemblies that wear or break.*
 - **Today:** *Unit, Direct Support (DS), General Support (GS), and Depot.*
 - **Future:** *Field (Unit, DS, GS) National (Depots, industrial base, qualified below depot activities)*

upgrading currently fielded systems to ensure they are operationally ready, "zero-time/zero-mile" systems. Rebuilding restores the systems to a like-new appearance, performance, and life expectancy, and inserts new technology to improve reliability and maintainability. Selected upgrade involves rebuilding the systems and adding warfighting capability improvements to address capability shortcomings. It is also important to note that Army depots, in partnership with industry, play a key role in the recapitalization effort. This effort partners depots with industry to take advantage of the relative strengths of both while continuing to meet statutory requirements. Recapitalization is a process that will impact many states across the Nation. For example, the M1 tank, while manufactured in only 1 state originally, will be recapitalized using components manufactured in 5 states and supported by subcontractors in more than 20 other states.

Prerequisites

The success of recapitalization programs will depend on three basic factors. The first is to develop the technical data and analyses to determine what the zero-time standard is for each system. Second, once the standard is determined, it must

meet the requirements for each system and its subsystems and components. Finally, components that are upgraded to the new standard must be adequately stocked in Army depots to support fielded systems.

Requirements

Annual recapitalization requirements as described in the Army's FY02-07 Program Objective Memorandum (POM) were determined based on the amount of end items for the objective force. The goal of the requirement was to reach half-life for the selected fleet in FY10. The number of weapon systems to be recapitalized each year was reduced based on asset availability and industrial capacity to increase production rates. This resulted in the executable quantity for the stated requirement. The dollars required for each recapitalization program were determined by estimating unit costs for fielded items each year through 2010. Recapitalization programs are partially funded from existing depot maintenance overhaul and procurement program funds without any additional funding in the FY02-07 POM. Based on current estimates, the Army needs an additional \$7.5 billion for its recapitalization program to succeed.

The Transformation

Recapitalization is a key element of the Army's transformation. It is a fundamental shift in weapons life-cycle management by maintaining the fleet average age at or below the half-life to address the impact of aging. Recapitalization requires both selected upgrades as well as rebuilding to zero-time/zero-mile standards.

A Partnership

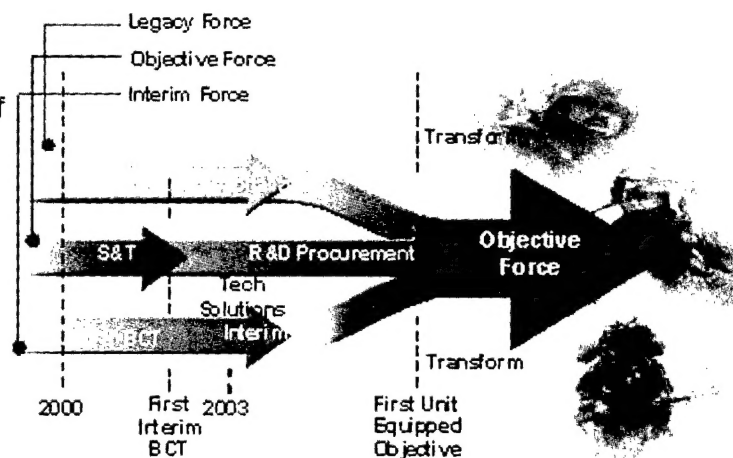
The Army Materiel Command (AMC), in partnership with program executive officers (PEOs) and the major commands (MACOMs), has taken the lead in establishing processes and procedures to initiate and execute recapitalization programs for the first 21 systems. Additionally, the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), the Office of the Deputy Chief of Staff for Logistics (ODCSLOG), and the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (OASAALT) are assessing the average fleet age for the initial systems selected for induction into the recapitalization program. These offices are also determining the required number of platforms to be recapitalized to meet each system's half-life metric.

RECAPITALIZATION: WHERE IT FITS

The Army Transformation

Recapitalization

"The rebuild and selected upgrade of currently fielded systems to ensure operational readiness and a zero-time/zero-mile system."



Half-Life Metric is the Measure of Success

BCT: Brigade Combat Team

Our soldiers' ability to fight and win future wars will depend largely on the quality of the equipment they are provided.

The next step is to determine the average fleet age of the more than 200 systems not selected for the initial recapitalization program and determine when to begin their recapitalization. This step also involves calculating the number of platforms required to meet the half-life metric, as well as prioritizing, by year, when they will be recapitalized.

AMC, assisted by ODCSOPS, ODCSLOG, and the OASAALT, will develop the capability to measure and collect "mile" or "hour" data on the more than 220 systems in the Army inventory. They will also improve the stockage determination process and the National Maintenance Program (enabled by Single Stock Fund) to position components to support recapitalization. Additionally, they will ensure that all 21 systems selected for induction into the recapitalization program have established depot-industry partnerships. Finally, data and lessons learned on depot-industry partnerships will be collected to provide guidance in improving current and future partnerships.

Conclusion

Our soldiers' ability to fight and win future wars will depend largely on the quality of the equipment they are provided. As such, the Army has undertaken a major effort to recapitalize its current inventory of aging weapon systems. This effort will ultimately provide the capability, reliability, and sustainability necessary for mission success of the objective force.

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RECAPITALIZATION AND UNIT SET FIELDING

LTG Paul J. Kern

"The legacy force, that magnificent Army we see busily deployed abroad today, will remain the force of choice should this Nation go to war anytime in the next 15 years. Its readiness to fight is paramount if we are going to have the luxury of time and investment to get the objective force right."

**—Army Chief of Staff
GEN Eric K. Shinseki
Excerpt from address to
Association of the
United States Army (AUSA),
Oct. 17, 2000**

Introduction

Upon announcing plans to create a strategically responsive objective force that will dominate the full spectrum of operations, Secretary of the Army Louis Caldera and Army Chief of Staff GEN Eric K. Shinseki made it clear that to meet its responsibilities as outlined in Title 10-United States Code, the Army must transform to a more deployable and responsive force.

The focus on developing an objective force that meets this Nation's strategic military requirements from 2008 onward does not relieve us of our commitment to the American people to fight and win any war during the interim. The age and condition of today's equipment presents us with a considerable challenge to meet that commitment when potential adversaries have access to increasingly sophisticated capabilities that can be deployed against us.

Parts of the current force must remain viable for many more years, until the objective force is fielded and meets the wide variety of missions for which it is being developed. If nothing is done now to address our aging equipment, the average age of critical systems such as the Abrams tank, AH-64 Apache, UH-60 BLACK HAWK, CH-47 Chinook, and Bradley Infantry Fighting Vehicle will exceed their 20-year expected service lives by 2010. The potential exists for the Army to move into the second decade of this century with a significant portion of its forces incapable of meeting a world-class threat.

Recapitalization Solution

Immediate recapitalization of today's equipment will prevent this vulnerability from occurring. Recapitalization is the maintenance and systemic upgrade of currently fielded systems to ensure operational readiness and a "zero-time/zero-mile" system. Through the recapitalization process, the clock is reset on aging equipment.

The Army's goal for recapitalization is to maintain the average age of each selected system at or below half the expected service life for the system by 2010. Recapitalization will not only extend the life of legacy systems, but will also reduce their ownership costs and increase their reliability and capabilities.

Because of its importance in maintaining operational readiness of today's equipment, Army leaders have identified

recapitalization as one of the three critical axes of the transformation. Other critical axes are research and development to evolve future technologies and creation of the interim force.

Status

The Deputy Chief of Staff for Operations and Plans (DCSOPS) identified and prioritized 21 initial systems for recapitalization. The 10 highest priority systems on that list (M1 Abrams tank, AH-64, UH-60, CH-47, the Armored Vehicle Launched Bridge, M9 ACE, M88 Recovery Vehicle, M2/M3 Bradley, the Multiple Launch Rocket System (MLRS), and the PATRIOT Air Defense System) are those most critical to maintaining the readiness of the digitized Counterattack Corps—III Corps. The modernization of the Counterattack Corps is necessary to preserve the Nation's heavy combat capability until the transformation is complete.

To meet recapitalization objectives, selected systems will be either sustained or selectively upgraded. Both paths insert new technologies and produce systems with a zero-time/zero-mile standard. The difference between the two paths is that sustainment programs will produce an end product having the same model number as the system that entered the program, while the selected upgrade programs will produce an end product with a new model number signifying added capability. For example, when an M1A1 tank is inducted into the Abrams Integrated Management (AIM) XXI Program,

a sustainment program, the finished product will be a zero-mile M1A1 tank with newly inserted technology.

An M1A1 tank entering the System Enhancement Program (SEP), a selected upgrade program, will be returned to the unit as an M1A2 model tank. Despite their differences, both paths produce systems with enhanced operational capabilities, extended lives, reduced ownership costs, and improved reliability.

Today, the AIM XXI Program is the only existing sustainment program, and there are currently seven ongoing selected upgrade programs—the M1A2 SEP, Hercules, Bradley A3, MLRS A1, M113 A3, M915A4, and the D7 Dozer.

Funding

The FY 02-07 Program Objective Memorandum (POM) includes funding for only \$15.5 billion of the \$23 billion needed to recapitalize the 21 DCSOPS-selected systems. At this funding level, recapitalization can only begin on 16 of these systems. Without additional funds, only 2 of the top 10 recapitalization programs, BLACK HAWK and PATRIOT, and the M915 Tractor will achieve the half-life metric by 2010. The remaining 13 funded programs will only be able to slow the aging process. This piecemeal recapitalization is insufficient to ensure the readiness of the force during the transformation. The Army Chief of Staff and other senior leaders are continuing to stress the importance of recapitalization to secure full funding for this critical effort.

Unit Set Fielding

The recapitalization effort is only one of many challenges facing the Army as we begin the monumental task of transforming our industrial-age force to a dominant objective force operating in the information age. The Army must also improve the way it transitions new systems from the materiel developer to the field.

Under the current process, we field new systems according to the Department of the Army Master Priority List. In many cases, units receive multiple, sequential fieldings during any given year. Each fielding, however well coordinated, has an impact upon the unit's readiness and

operational tempo. With multiple fieldings, units have difficulty maximizing the capabilities of new equipment and maintaining peak unit performance.

Future Combat Systems (FCS) will be developed as a fully integrated "system of systems." This approach requires concurrent fielding of networked systems. Fielding of individual, uncoordinated platforms no longer delivers warfighting capability for units. Fielding the objective force using the current process would fail to optimize the capabilities for which the FCS is being developed.

The Army Vice Chief of Staff has designated the DCSOPS as the Army's System of Systems Manager. To minimize unit disruption while maximizing operational efficiency, the DCSOPS will indicate, in a forthcoming prime directive, that future fieldings will be conducted in fully coordinated sets of equipment called Unit Set Fielding (USF). At a minimum, a unit set includes a backbone of digital command, control, communications, computers, intelligence, surveillance, and reconnaissance systems and weapon systems necessary to provide a common operational picture, enhanced situational awareness, and increased lethality. USF will allow the Army to synchronize fielding of interrelated and interdependent systems.

The "single-system" Total Package Fielding concept remains relevant as a subset of the USF process. In the past, as we fielded a single system, the receiving unit had to consider the impact of that one system on its doctrine, training, leader development, organization, materiel, and soldiers. Under the USF process, units receiving new equipment will have to consider the impact of numerous new systems on those same factors. The new process is aimed at reducing the destabilizing effect of sequential fieldings. It will also act as a major enhancement to system integration and, thus, promises to accelerate the force development process.

USF will begin with the 1st Cavalry Division and will dovetail into the transformation process with the fielding of the 3rd Interim Brigade Combat Team. Thereafter, USF will apply to all Active and Reserve component fieldings.

The DCSOPS will determine the priority and timing of specific USF using the Army Modernization Schedule (AMS) and related Army Order of Precedence. The AMS will identify the USF window for each unit. After the USF window has closed and the unit has trained with its new equipment, the unit's major command will be responsible for validating the unit's readiness to execute wartime missions. This process should smooth out the readiness rating spikes and valleys associated with sequential fieldings resulting in a more consistent readiness rating.

Conclusion

GEN Shinseki has directed us to meet the Army's transformation vision. The Army's mission has always been consistent—fight and win this Nation's wars. Maintaining our commitment to this mission will never end. We cannot allow our current equipment to deteriorate as we transform to an objective force. Recapitalization will ensure the Army's continued ability to execute the National Military Strategy before the transformation to the objective force is complete.

USF is another critical aspect that will ensure a smooth transition as we upgrade the capabilities of the current force to those of the objective force and provide the Army with a timely, complete, and integrated capability.

LTG PAUL J. KERN, as the Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology, is the Senior Military Advisor to the Army Acquisition Executive and the Army Chief of Staff on all research, development, and acquisition programs and related issues. He supervises the Program Executive Officer system and serves as the Director, Army Acquisition Corps.

THE PALADIN ENTERPRISE MODEL OF RECAPITALIZATION

BG Edward M. Harrington and
LTC Barney J. Stenkamp

Introduction

Every so often, a "good news" story comes along that must be shared with others. The Paladin Production Enterprise, a highly successful government-industry partnering effort resulting in the production of 786 M109A6 Paladin 155mm Self-Propelled Howitzers is just such a story. Simply called the "Paladin Enterprise," this pioneering effort was conducted from 1993-1999 at Lettinkenny Army Depot (LEAD) in Chambersburg, PA. The principal participants included LEAD; United Defense Limited Partnership (UDLP); the Product Manager (PM), Paladin/Field Artillery Ammunition Support Vehicle (FAASV); and the Defense Logistics Agency (DLA).

Recipient of the prestigious DOD Standardization Award, the Paladin Enterprise deserves special recognition because it resulted in every howitzer being delivered ahead of schedule, within budget, and with no major material or quality deficiencies. Another key achievement is that during the 6-year production run, numerous improvements were introduced and universally applied so that each and every vehicle was configured precisely like every other.

It is important to add that the Paladin and its companion armored ammunition carrier, the FAASV, introduced a "revolu-

tion in cannon artillery" by enabling a huge increase in responsiveness, survivability, and lethality over its older cousins that were used during the period from Vietnam through the Gulf War. Although the term was not yet in vogue, we might now call the Paladin Program a recapitalization program with upgrades. Therefore, it is instructive to review the decisions made and actions taken early in the program so they can be applied as lessons to current recapitalization efforts.

M109 History

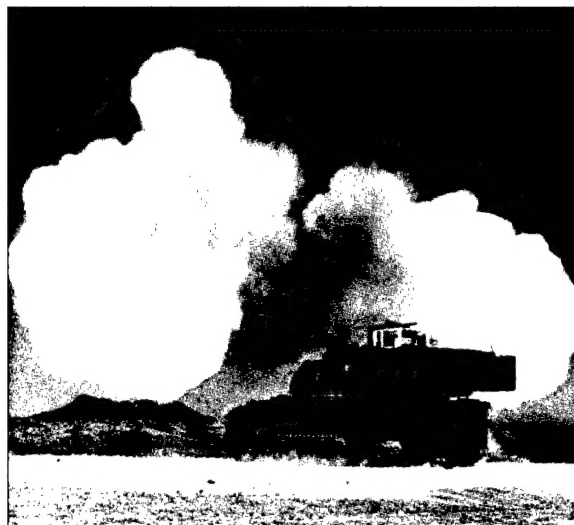
The original M109 Howitzer was introduced to the Army during the early 1960s. Before Paladin, the M109 Howitzers received a series of upgrades focused primarily on improving reliability. In 1985, the Army initiated the most extensive modernization effort to date resulting in the modern-day M109A6 Paladin. Like other legacy systems, the Paladin (at 32 tons) is too large and too heavy for transport by C-130 aircraft. Over one-half of the Paladins belonging to the Army's Active components will eventually be displaced to the Army National Guard as a result of fielding the Crusader between 2008 and 2012. A significant number of Paladins will then remain side by side with Crusader in the Active force until they are replaced by the

Future Combat Systems. Thus, a second technology infusion recapitalization may prove extremely beneficial during this transformation of the artillery force.

In the 1980s, four main deficiencies in the existing M109 fleet were identified: lethality, survivability, responsiveness, and overall system reliability. The fleet had aged to where it could no longer fully meet the current threat. The Howitzer Improvement Program—the precursor to the Paladin Program—was thus initiated to address those deficiencies. The Required Operational Capability, dated Aug. 2, 1988, required a range of at least 22 km unassisted, 30 km assisted, and an alternative cannon to be developed to achieve extended range beyond 40 km. It specified a cruising range of more than 180 miles, a combat-loaded weight under 32-1/2 tons, and a driver's night-vision device.

Improved survivability was to be provided by improved ballistic shielding; fire prevention protection; and nuclear, biological, and chemical protection. The revolution, however, would come from an onboard fire control computer capable of onboard ballistic computation and automatic gun laying, integrated with a highly accurate navigation system and digital communications. This freed the M109A6 from needing surveyed firing points and

**Paladin test firing
at Yuma Proving
Ground, AZ.
An extended-range
Paladin
was tested later,
but not fielded.**



close proximity to the Battery Computer System. This resulted in a quantum leap in responsiveness and revolutionary changes in doctrine and tactics—frequent survivability moves (“shoot and scoot”). Ultimately, it allows fighting in highly dispersed platoons rather than in tightly controlled batteries.

Further upgrades were envisioned in a Preplanned Product Improvement (P3I) Program. Many of the improvements, including mobility, rate of fire, range, and survivability, were developed and tested to varying degrees both before and during production. Although these P3I items were eventually rejected, they could still be adopted as product improvements.

Recapitalization And The Paladin Enterprise

The Army decided the most economical course of modernization would be to rebuild and upgrade the existing M109 chassis with new, more powerful engines, stronger suspensions, and upgraded transmissions; then add an all-new cab structure with improved main armament and a revolutionary fire control system. In the end, up to \$400,000 was saved per vehicle compared to a totally new build. The resulting Paladin is nevertheless reliable and affordable to

maintain, and the improved chassis has just begun to qualify for overhauls—amazingly at the same rate predicted for an all-new vehicle. This clearly validates the Enterprise approach.

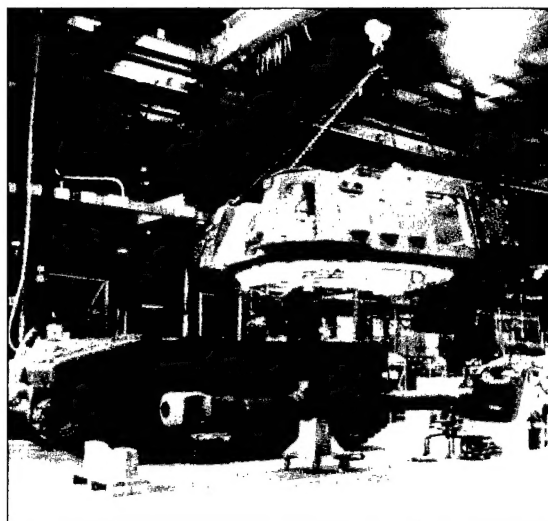
After the low-rate initial production of 164 vehicles by BMY Combat Systems, York, PA, the Army chose to compete the full production program of 786 Paladins. To nearly everyone’s surprise, the competition was won by FMC, a decided underdog. The key to their winning bid was their unique proposal to cre-

ate an “Enterprise” approach collocated with the government’s chassis operation at LEAD. Both cost and program risks were reduced by using government facilities and workers teamed with a collocated FMC workforce. The Defense sectors of FMC and BMY soon merged, creating UDLP. The new company used and improved on the innovative processes proposed by FMC and embraced the government members of the team, thus capitalizing on the best that public and private sectors had to offer. Many members of the Army Acquisition Corps had the privilege to visit the Paladin Production Enterprise while attending various Defense Acquisition University courses, most notably the Advanced Program Management Course. All who visited were amazed by the cooperative “can-do” spirit and the sheer absence of any “we-they” attitude. The Paladin Enterprise was truly a team effort.

Technology Infusion

The Paladin production process began with the induction of an earlier version M109 by LEAD personnel, and the subsequent “tear-down” of the turret, power pack, track, suspension, and every other bolt-on item. All brackets, panels, and parts considered unnecessary were sawed or chiseled off. The hull was sandblasted to bare metal in preparation for modifications. The hull was also modified through a series of welding and machining processes with enhancements such as selective strengthening, larger torsion bars, hydraulic bump stops, and a new remote-controlled travel lock.

Every joint, new and old, was thoroughly X-rayed, inspected, and rewelded as necessary. This “like-new” hull structure was then reassembled using new, more powerful engines, improved transmissions, a new suspension and track, and a 650-amp generator replacing the older 100- to 180-amp power sources. The result was a “zero-hours, zero-miles” chassis with far



New larger cab being joined to completely refurbished chassis at Letterkenny Army Depot.

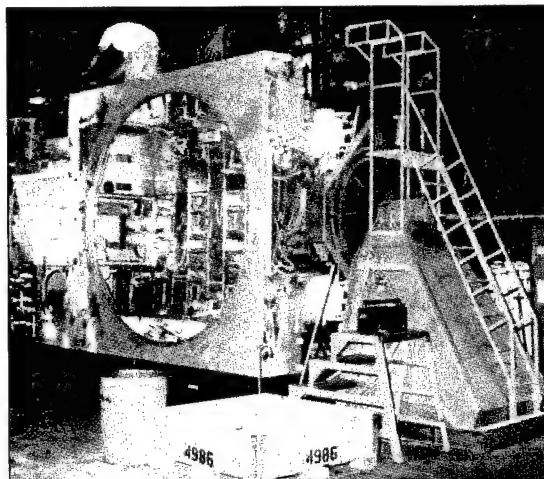
more speed, power, strength, and mobility than all prior M109 Howitzers.

The completed chassis was provided to UDLP, which integrated an all-new larger cab that had been produced at their York, PA, facility. However, all assembly and integration work was completed in their building on LEAD property. Lettorkenny and UDLP personnel jointly performed road, firing, and navigation tests on the assembled howitzer before government acceptance and final painting. At full-rate production, 16 to 18 vehicles were rolling off the line per month—all early for more than 2 years, all within budget, and all without deficiencies.

The Enterprise Spirit

Contrary to conventional wisdom that government-furnished equipment (GFE) can't be counted on, both LEAD and UDLP were provided a great deal of GFE by PM, Paladin/FAASV—on time, according to agreed-upon schedules. Conversely, LEAD provided many parts and assemblies to UDLP, and UDLP provided many parts and assemblies to LEAD. The real spirit of the Enterprise was the fact that every member was both a customer and a supplier to every other member, so nobody could succeed or fail on their own. This teamwork did not happen by accident. A highly respected consultant was brought in at the outset to help forge a shared vision and set of values for the Enterprise. Subsequently, all members worked together to obtain waivers and exemptions to then-existing regulations to minimize both paperwork and surcharges associated with the flow of parts among the Army, DLA, and UDLP.

The Paladin Enterprise is a shining example of what the Army hopes to gain from current and future recapitalization programs, and what can happen when government and industry team with common goals and objectives. Vehicles were produced that were more reliable, maintainable, and combat capable. The improvements were so significant that they have changed the way artillery units



Completely stripped chassis being sanded, welded, and modified to achieve "as-new" condition.

fight, while decreasing their workload and support burden.

Lessons Learned

In retrospect, the following can be considered key to the success of the Paladin Enterprise's Recapitalization Program:

- Jointly develop user and PM requirements to find the most cost-effective performance increases.
- Establish common goals and objectives for the team.
- Identify and understand the needs of all stakeholders.
- Don't be afraid to go to "outsiders" for expertise.
- Build and maintain positive relationships. Trust is key.
- Empower teams and set clear expectations of them. They must know that they have both responsibility and the requisite authority.
- Question authority. You can get relief from rules and regulations that don't make sense for your program.

If the above lessons are applied to a government-industry partnership so that walls between organizations fall, then teams can work "out-of-the-box" for a

common goal. This allows legacy system recapitalization projects to remain relatively inexpensive, while still providing immediate benefits to soldiers in the field. Soldiers can then quickly be provided with the best possible weaponry and materiel to fight today and tomorrow.

Postscript: PM, Paladin/FAASV and UDLP are proud of their shared achievements and are now working with new partners at Anniston Army Depot, Anniston, AL; and the Defense Depot, Anniston AL; in recreating the spirit of partnership and joint ownership at a new location. This new Enterprise is now producing additional Paladins for the Army National Guard, whose divisions sorely need the mobility, survivability, effectiveness, and digital interoperability that only Paladin can provide.

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ABRAMS MODERNIZATION: KEEPING THE BEST AHEAD OF THE REST

COL James R. Moran

Introduction

The M1 Abrams tank system has represented a significant portion of the Army's combat power on the battlefield since its introduction in the early 1980s. Proven in the Persian Gulf War, the system continues to fulfill its role as the principal armored combat weapon system of the Army's armor units. Although recent initiatives have resulted in lighter Army forces, the Abrams system is expected to remain in the force structure for the foreseeable future, with some projections showing its service to 2030 and beyond.

The challenge, then, is to keep the Abrams fleet in top form by maximizing combat effectiveness as efficiently as possible. Specifically, this means making the best use of available research and development (R&D) and operations and support (O&S) dollars. The only way this can be accomplished is to develop an effective modernization strategy that includes the best investment mix for upgrading, retrofitting, and overhauling Abrams tank resources. This article presents a snapshot of the Abrams Modernization Program by discussing the ongoing range of initiatives designed to maintain the technological "edge" the Abrams has achieved on the battlefield.

Modernization Initiatives

As mentioned, the Abrams modernization strategy incorporates three project thrusts: upgrades, retrofits, and overhauls. The upgrade thrust targets the conversion of obsolescent M1 Basic vehicles, most built in the early 1980s, into the latest version—the M1A2 System Enhancement Package (SEP). This is the most radical conversion and consumes the most resources in terms of time and dollars. The second thrust is the retrofit of M1A2 systems into the fully digitized M1A2 SEP configuration. The third thrust is the overhaul of the M1A1 system into a digitized and more capable version of the M1A1

called M1A1+. This latter, far-reaching effort is dubbed the Abrams Integrated Management (AIM) Program. AIM is essential for modernizing the M1A1, the tank that encompasses the bulk of the fielded systems.

In addition to the initiatives designed to systematically upgrade, retrofit, and overhaul Abrams tank systems, programs are underway to recapitalize subsystems that outfit all tank systems. These efforts are aimed at reducing costs for repair and replacement of major spares. For example, the existing Abrams AGT 1500 engine has been a significant O&S cost driver for the Abrams fleet. An ongoing two-phased effort is designed to improve the engine performance in both the short- and long-term. Electronic obsolescence of the increasingly digital components presents a continuing challenge as the special purpose electronic components age. Modular electronic componentry is now an essential modernization feature to simplify electronic upgrades and lower costs.

The results of the recapitalization effort benefit each of the tank modernization strategies by providing more cost-efficient subsystems, which will eventually drive down the O&S costs for maintaining the Abrams fleet. Recapitalization also positions the Abrams as a stiff competitor for foreign military sales opportunities and for development of tank-variant vehicles. These investment strategies are described below in more detail.

M1 Basic To M1A2 SEP

Today, M1A2 SEP production begins with the induction of M1 Basic vehicles at the Anniston Army Depot (ANAD) in Alabama. The vehicle turret and hull are disjoined and disassembled. The components scheduled for reuse are inspected, repaired, and refurbished. Components are then reassembled and shipped to the Lima Army Tank Plant (LATP), Lima, OH, where the M1A2 SEP vehicles are completed in accordance with the upgraded Technical Design Package.

Figure 1 depicts the scope of major improvements made to the M1 to upgrade to the M1A2 SEP. The process calls for installation of a new turret that includes all new wiring harnesses, armor, weaponry, and electronic componentry with a digital data bus. The hull, while less significantly overhauled, is modified with appropriate engine and transmission rebuilds and integrated with new and improved track and suspension components. One of the final steps is integrating the new turret and the rebuilt hull. Following the government's acceptance, the new M1A2 SEP vehicle, with a new serial number and the traditional "new-car smell," is issued to the field.

The M1 Basic to M1A2 SEP conversion is the most extensive and costly modernization innovation ever made to the Abrams fleet. Unfortunately, only a portion of the fleet will be upgraded under this process. Current investment funds allow only about 20 percent of the required tank fleet to be upgraded to the M1A2 SEP configuration. Thus, it represents only one portion, albeit a very significant one, of the Abrams modernization effort.

M1A2 To M1A2 SEP

The major improvements originally made to the M1A2 were the addition of a second battle sighting system (which allowed the commander to select targets independent of the gunner), a driver's steer-to-control display, and the first built-in test diagnostics system fielded on a tank. The M1A2 SEP included these improvements and many more such as second generation forward looking infrared (FLIR), the Army's objective command and control (C2) system, the Global Positioning System, an auxiliary power supply system, crew thermal management, color tactical displays, and signature management. The M1A2 SEP is the first true digital system and maintains signal and computer processing with room for future growth.

Because approximately 620 M1A2 systems were initially produced and fielded prior to the approval of the SEP modernized system, it became necessary to retrofit the original M1A2s to the SEP configuration. Many of the changes are simple module swap-outs, but a number of the changes need reconfiguration of mounts and cabling to satisfy the retrofit to the SEP configuration. The majority of these involve the integration of digital C2, power supply modules, and communication devices added by SEP. The program goal is to bring all M1A2 vehicles to a common SEP capability and physical configuration.

One of the most basic challenges in the retrofit program is maintaining a pure fleet in

fielded units. A staggered schedule of M1A2 turn-ins and M1A2 SEP issues has been devised covering a period of nearly 4 years to ensure units are fielded as unit sets. In addition, the schedule complements the production of "new" M1A2 SEPs from basic M1s (as mentioned above). A mixed strategy of upgrade and retrofit is necessary because there is insufficient funding to go the pure upgrade route and insufficient retrofit assets to achieve the end-state objective quantity of M1A2 SEP systems.

AIM

The majority of fielded M1 Abrams (about 4,500 vehicles) are the M1A1 type. Most of these systems were built in the 1985-1993 timeframe. As such, they incorporate the analog technology of the early 1980s. Unfortunately, analog technology is no longer state-of-the-art in the digital age of

the 21st century. The AIM Program is the innovative concept developed to systematically overhaul the M1A1 to the more capable M1A1+.

The AIM Program does not incorporate enhanced systems that provide the battle overmatch features of the M1A2 SEP Program. Instead, the program focuses on overall improvements in system readiness and features an innovative teaming concept between ANAD and the Abrams tank's prime contractor, General Dynamics Land Systems (GDLS). The goal of this teaming effort is to overhaul the M1A1 to factory standards and to apply, at one time, all accumulated modification work orders (MWOs).

Similar to what was described in the M1A2 to M1A2 SEP upgrade process, ANAD personnel take inducted M1A1 vehicles and clean, inspect, and disassemble chassis and turret components. Additionally,

they perform restoration operations and apply selected technological components (Figure 2). GDLS personnel at LATP facilities collaborate further in applying MWOs to the turret and hull. These personnel also complete required system tests and final preparations for shipment. While the finished tank is in a "like-new" condition when issued back to the field, it still operates with 1980s analog technology. The prime benefit of the overhaul program is its effectiveness in applying high-payoff recapitalization projects at a greatly reduced cost when compared to field retrofit of MWOs.

Recapitalization Initiatives

One of the most significant of the high-payoff recapitalization projects is the search for an improved Abrams engine. While the AGT 1500 engine represents late 1960s technology and approximately 12,200 engines

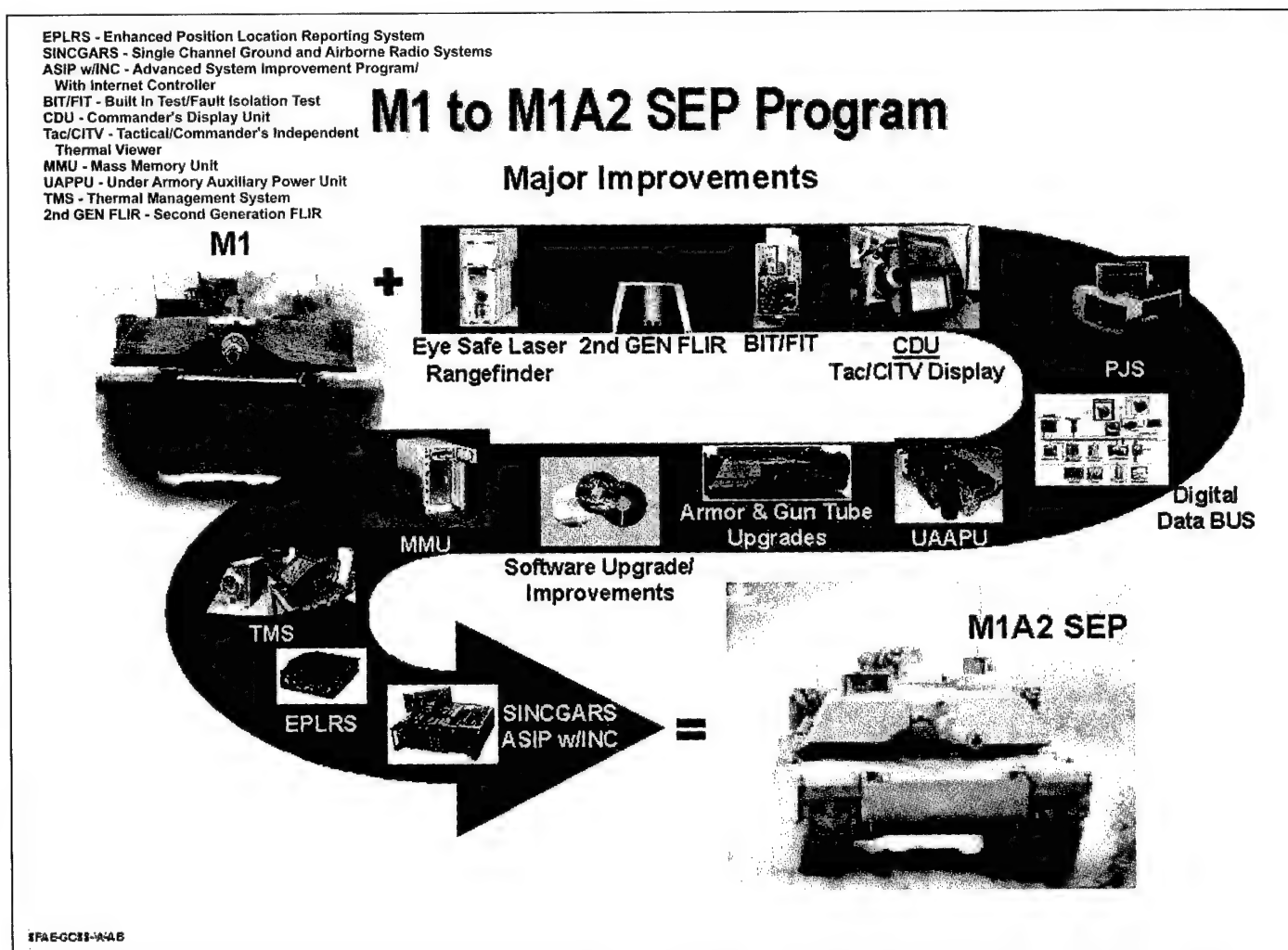


Figure 1.

AIM Program

Overhaul + Applied Improvements

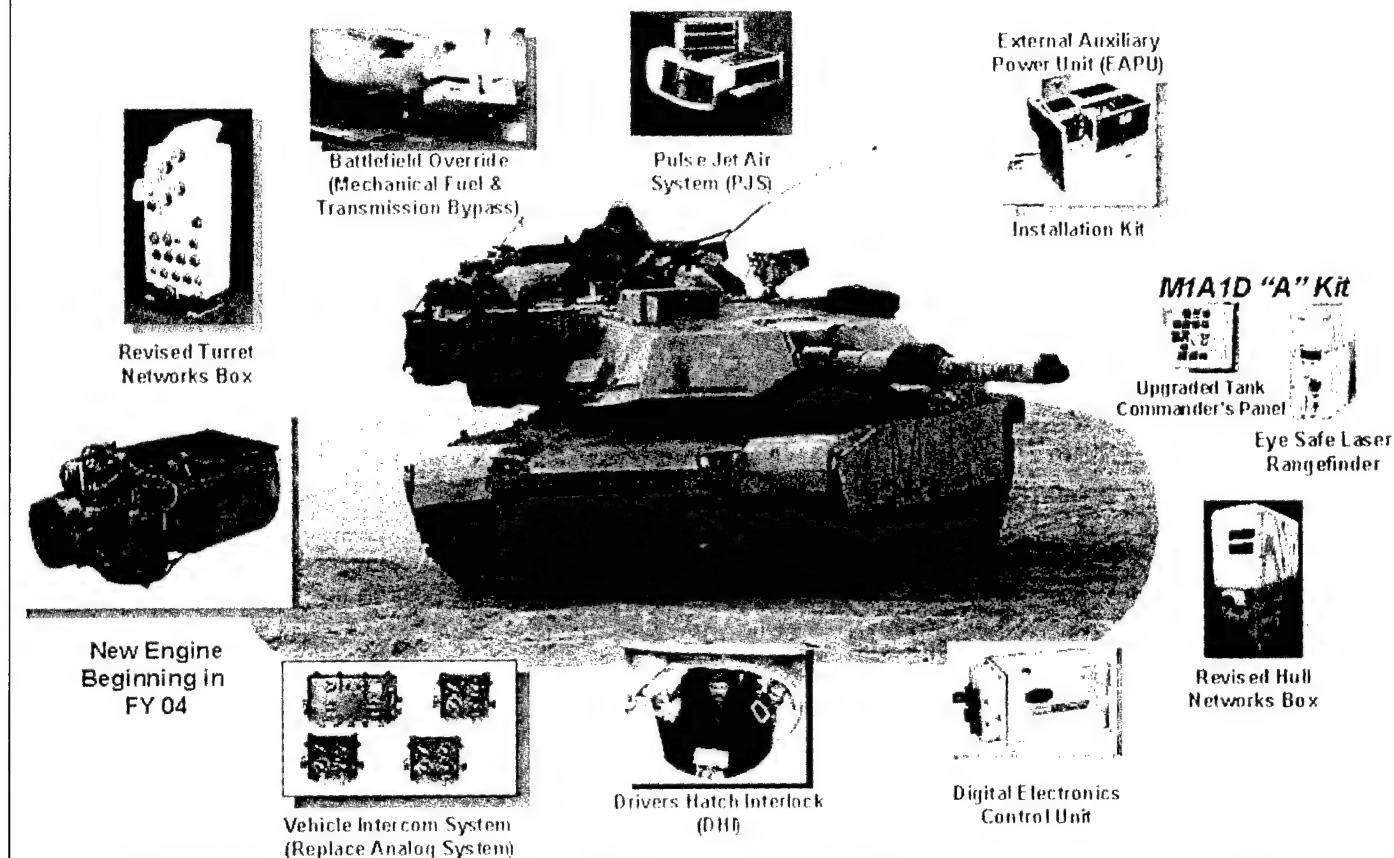


Figure 2.

have been built, none have been produced since 1992. Today, all replacement engines, even those in the M1A2/AIM Programs, are overhauled engines that incorporate several reliability and durability improvements. However, program results have not shown significantly improved Mean Time Between Repair (MTBR) rates. Consequently, the engine is the biggest single cost driver, representing approximately 60 percent of the Abrams' O&S costs.

The engine recapitalization program is two phased. The first, called PROSE (Partnership to Reduce Operation and Support Costs, Engine), is a partnership among Honeywell, GDLS, and the Program Manager (PM), Abrams Tank System. This phase is designed to establish best-commercial practices, reduce multiple buyers, and consolidate engine overhaul operations, field service, and sustainment management. The second phase is a major initiative to "repower" the Abrams tank. A number of technological improvements have been made that show promise for

reducing fuel consumption, reducing moving parts and power-pack size, improving mobility, and increasing MTBR. Collectively, these enhancements suggest multiple options for engine improvements that are under investigation.

The engine represents a prime recapitalization effort that would benefit all the M1 variants, but other initiatives are also under consideration in the Abrams Modernization Program. These include constant efforts to reduce the costly effects of electronic obsolescence through the use of modular, plug-in components, and improved diagnostics and prognostics to simplify repair and logistical support considerations.

Conclusion

The Abrams tank provides the mobile protected firepower demanded by soldiers on the battlefield. As such, its modernization is critical to maintaining high operational capability and overmatch over potential threat systems. The Abrams tank system's recapitalization efforts and similar concepts are

now being considered for other combat systems. Abrams continues to be an example for other fleets to emulate in an era of declining resources. The goal of PM, Abrams Tank System is to seek the most cost-effective integration of upgrade, retrofit, overhaul, and recapitalization strategies that will allow the Abrams to remain in the forefront of the U.S. Army's armored capability.

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PARTNERING WITH PRIVATE ENTERPRISE ON ARMY POSTS

Mahlon Apgar, IV

Introduction

Excess space in Army buildings increases overhead costs, yet excess land on Army posts could be a valuable hidden asset. With tight budgets and immense needs, the Army must find ways to leverage its limited resources by working with the private sector. The Office of the Assistant Secretary of the Army (Installations and Environment) has adopted a theme of "Partnering with Private Enterprise" to convey this overarching aim.

Private enterprise includes both businesses and nonprofit organizations. The Army is looking to these partners to help it become more efficient and effective in its "noncore" activities that support the warfighter. These noncore activities include the design, construction, operation, maintenance, and management of Army facilities and installations; the preservation and enhancement of historic Army properties; and the conservation, compliance, cleanup, and site-disposal functions of the Army's environmental stewardship.

Public-Private Partnerships (PPPs), a new Army initiative, involve the private sector in the planning, development, financing, ownership, and operation of an Army facility or service. They help to leverage scarce resources of funds, time, and talent by providing new sources of funds, improving quality of service, increasing productivity, and reducing costs. These activities support and sustain our soldiers in carrying out their mission.

Defining PPPs

PPPs have two components: attracting private *capital* to help fund the Army's programs and operations, and engaging private *enterprise* to help design and execute programs. The Army's initial PPPs have included utilities, family housing, and land cleanup, and they were driven by the principle of leveraging the Army budget through new sources of funds.

But capital alone is not enough. The Army must also benefit from what I call the "4-Es" of private enterprise: the entrepreneurship, efficiency, effectiveness, and expertise that industry—especially business, professional, financial, and technology-based firms—can bring to a partnership with government. This means leveraging the ideas, knowledge, and capabilities of private enterprise throughout the functions of installation management such as land cleanup and disposal, community development and homebuilding, and base operations and management. This is not only about applying best-business practices; it is also about the fundamental art and science of land use, asset management, and operating services on military installations.

Privatization is a major element in PPPs. An oft-quoted but little understood term, it is often used in government as a synonym for outsourcing. But the two are very different. Outsourcing has been standard practice in the Army for years, as it has in corporate America. It is the process of contracting with outside, independent

organizations that can provide support services faster, better, or cheaper than the Army can—mainly because those services are *their* core business.

Outsourcing does not shift the responsibility for performance or change the nature of the service. It merely changes the organization and methods of supplying or delivering the service. For example, when trash collection or publication of the garrison newsletter is outsourced, the Army still retains responsibility for ensuring that the service is accomplished on time and within budget, and that it meets service quality standards and other requirements the Army has defined and to which the vendor has agreed.

Privatization, on the other hand, goes much deeper than outsourcing. It shifts some or all of the responsibility for planning, organizing, financing, and managing a program or activity from the Army to private contractors and partners, while retaining an interest in the operations, services, and profits of the program. Additionally, it may involve allowing a private entity to use some or all Army assets such as land, buildings, and equipment. For example, in the 1996 Military Housing Privatization Initiative (MHPI), Congress gave the Army a number of new authorities to privatize military housing. In most cases, the Army intends to lease the land and provide the use of its assets while retaining ownership for future requirements.

The bottom line is that any military function or activity that is mirrored by a large, diverse, competitive market in the private sector is a candidate for privatization. This concept is relatively new to the Army and DOD. Thus, it is especially important to clarify its meaning, particularly in view of the new doctrine and applications being developed to redirect the way the Army does business.

In my view, privatization *means* partnership and can be accomplished only *through* partnership. Partnership is, by definition, a two-way relationship—whether it's among individuals, within organizations, or between businesses and government. It is characterized by mutual interests, mutual understanding, mutual respect, and mutual responsibilities throughout a partnership's life.

Why PPPs?

The Army is focusing on PPPs for two reasons. First, because of Army force-structure reductions, the Army has significant amounts of underused assets. There is a huge inventory of land, buildings, and other facilities that divert scarce resources from critical needs such as modernizing the force and improving the quality of life for our soldiers. Private enterprise is better at creating value from real estate assets that are underutilized—value that potentially could be monetized and redeployed for other Army needs. Thus, PPPs are one of the main levers in reducing the Army's vast infrastructure.

The second reason for focusing on PPPs is that our Army posts represent substantial economic value (replacement cost is about \$220 billion, nearly twice the value of our equipment), and they consume more than \$10 billion dollars annually (about 15 percent of the total Army budget). In an era of scarce resources, this alone is cause for concern because the Army cannot afford to short-change the "tooth" (our warfighting capability) by overspending on the "tail" (our support facilities and services).

PPPs At Work

To date, the Army has limited but important experience with PPPs. In housing, for example, there is a \$6 billion backlog of substandard Army family housing that would take years to clear using current budget limits and procedures. As a result, housing privatization is a major priority for the Army and the Office of the Secretary of Defense; the goal is to eliminate all inadequate housing by using a combination of military construction funds and the new authorities Congress provided in the MHPI.

The Army launched the Residential Communities Initiative (RCI) to design, test, and implement an innovative approach to privatizing family housing. RCI will enhance the quality of life for soldiers and their families through partnerships among the Army, homebuilders, and developers to build, manage, and maintain residential communities on Army posts. These communities will include not only housing, but the amenities and support services that most Americans enjoy in their neighborhoods and communities.

RCI will maximize the Army's advantages of scale and diversification, and the private sector has already shown strong interest. The Army is offering a long-term, "whole-post" community development and management opportunity with various financing features and incentives. The private sector gains an opportunity to design and build using local market standards. The Army gains an array of ancillary support facilities such as "tot lots" and community centers. The creativity from engaging development partners and the 4-Es is already apparent in pilot projects at Fort Carson, CO; Fort Hood, TX; Fort Lewis, WA; and Fort Meade, MD.

Streamlined Procurement Process

Procurement reform is an essential element in RCI because the conventional contracting system precludes many quali-

fied firms from partnering with the Army. For privatization to work, the Army must make it easier and cheaper for the private sector to partner with us and to involve partners (once selected) in project planning.

To begin streamlining procurement, the Army re-engineered the front-end of the process by designing a Request For Qualifications (RFQ) as an alternative to the traditional Request For Proposals (RFP). RFQs have been used successfully by the General Services Administration, the U.S. Postal Service, numerous state and local governments, and large companies.

The RFQ template defines the qualifications the Army is seeking in prospective partners and criteria for selecting them, and background information about the project and the problem to be solved. Generally, qualifications include the preliminary concept and business approach to the project, financial resources, management capabilities, and—most important—demonstrated experience in projects of comparable scope and complexity. Once the partner is selected, the partner and the Army jointly prepare a Community Development and Management Plan. This plan sets the terms of the partner's relationship with the government throughout the life of each project.

This contrasts markedly with the traditional RFP in which the Army details its plan and contractors bid on it. RFPs are very costly and time consuming, both for the Army and the bidders. They also preclude contractors from applying their ingenuity to redefining a project concept and plan during the bidding process. Although winning contractors could redefine plans after the award is made, they would have little incentive and might even have to rebid the contract to do so. Consequently, the Army designed the RFQ process to select long-term quality partners with good track records. PPP innovations are also being pursued in other installations and environment functions.

Utility Operation And Maintenance

One of the Army's earliest PPP initiatives included partnering with the private sector for management of water, sewer, and electric utilities. This initiative allows the Army to transfer ownership, operation, and maintenance of water, electricity, natural gas, and sewage-treatment facilities to a private firm or special local authority. To date, the Army has accomplished this on 45 systems and plans to evaluate nearly 300 more systems for transfer during the next 3 years.

A powerful tool in this transition is the Energy Savings Performance Contract in which private firms invest capital and provide energy enhancement equipment such as high-efficiency boilers, heat pumps, and lighting. It allows the installation to leverage a contractor's resources to perform energy-saving infrastructure improvements.

Land Cleanup And Reuse

Another new administrative tool granted by Congress has assisted the Army's land cleanup efforts. To prepare contaminated land for reuse, the Army has traditionally performed the cleanup before transferring properties to local communities for redevelopment. It is now employing the "early transfer authority" Congress has granted in partnership with the private sector to encourage investment and entrepreneurship in redeploying Army assets.

Managing A Remediation Partnership

Another superb illustration of a public-private partnership is at the Army's Rocky Mountain Arsenal, 10 miles outside Denver, CO. The Army is using a novel program management concept to accomplish DOD's largest-ever cleanup effort. The Army, the U.S. Fish and Wildlife Service, and the Shell Oil Co. created a unique partnership to accomplish this project. Secretary of Defense William S. Cohen visited this facility and declared it a "national model."

Incentives

To attract private sector partners, the Army must provide incentives. The firms being sought as partners—those with the required talent, technology, and resources—will not engage with the Army simply because it's big and it's here. However, it is likely that they will respond to four incentives the Army can offer and to an aggressive marketing program that shows the Army is serious.

The most obvious incentive is profit. There must be opportunities for real operating profits and/or residual values in every venture the Army seeks to privatize. Otherwise, it will not be a sustainable, long-term business proposition.

With profit comes risk; therefore, the second incentive is enabling industry to balance the risks and rewards of partnering with the Army. Some of the Army's capital and operating risks can be shifted to the private sector in return for potential profits. Additionally, a provision for guarantees against base closures and major deployments in housing privatization reduces those extraordinary, uncontrollable risks for private developers.

Third, the Army offers *scale*, *scope*, and *sustainability* to prospective industry partners. There is an enormous backlog of housing, offices, warehouses, community facilities, and other buildings to be renovated, and thousands of sites to be cleaned up and reused. From a business perspective, the size and diversity of the Army's real estate portfolio should enable companies to plan their market entry *strategically* for the long haul. However, they can do so only if the Army articulates its needs in the same way that large corporate "market-makers" do. Moreover, few organizations in America can aggregate and structure programs in multimillion and multibillion dollar packages such as the Army can. If the Army does its job well, it should attract many prospective partners and broaden the competitive base.

Finally, the Army can and must use innovative procurement methods such as qualification-based selection, joint project planning, performance-based contracting,

and incentive-fee contracting. These methods challenge industry's ingenuity to find better, cheaper ways of meeting the Army's objectives and ensure that the Army employs better quality partners.

Conclusion

The Army is vigorously pursuing public-private partnerships because they are important in leveraging resources and improving the quality of life and well-being of its soldiers and their families.

The Army wants to partner with industry and harness its *entrepreneurship*, *efficiency*, *effectiveness*, and *expertise* wherever it can. These must be true partnerships that recognize the benefits derived from a balanced relationship having shared goals and expectations.

Army posts present some of the most complex management challenges in America. PPPs are a means to help the Army meet these challenges. Those who plan and manage the Army's resources have a critical role in applying knowledge and ingenuity to PPP initiatives.

Partnering with private enterprise promises opportunities for business and solutions to meet the Army's needs. Soldiers and their families deserve no less.

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Apgar received an A.B. degree from Dartmouth College in 1962, where he was a Rufus Choate Scholar and a Distinguished Military Graduate of Dartmouth's Army ROTC Program. He resumed his education at Oxford University and later received his M.B.A. degree from the Harvard Business School.

ARMY RECOGNIZES OUTSTANDING R&D ORGANIZATIONS

Since 1975, the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT) has presented annual Research and Development Organization (RDO) of the Year Awards to Army organizations in recognition of outstanding technical and managerial programs implemented during the preceding fiscal year. Specifically, RDO awards recognize the best research and development (R&D) programs and best-managed organizations that enhance the capability and readiness of Army operational forces and the national defense and welfare of the United States. At an awards ceremony at the Pentagon Sept. 11, 2000, ASAALT Paul J. Hoepfer presented the annual awards to selected organizations for FY99 achievements.

RDO Award recipients were selected by an evaluation committee chaired by the Director for Research and Laboratory Management, Office of the ASAALT, and composed of highly qualified members from the Army and DOD science and technology communities. The committee evaluated both written nominations submitted through each organization's major command and verbal presentations from each organization's commander or director. Organization rankings were based on accomplishments and impact; organizational vision, strategy, and plan; resource management; and continuous improvement.

Based on the review of accomplishments, the evaluation committee selected two RDO of the Year Award recipients, one in the Large Laboratory Category (600 employees or more) and one in the Small Laboratory Category (less than 600 employees).

Additionally, the evaluation committee selected two organizations (one large and one small) for Army RDO Excellence Awards in recognition of FY99 research accomplishments.

Army RDO Of The Year— Large Laboratory Category

The winner selected for the *RDO of the Year Award—Large Laboratory Category* was the U.S. Army Tank-automotive and Armaments Command's Armament

Suzanne Kirchhoff

Research, Development and Engineering Center (TACOM-ARDEC), Picatinny Arsenal, NJ. TACOM-ARDEC and its predecessor organizations have a distinguished history in armaments and munitions development and production dating back to the Revolutionary War.

TACOM-ARDEC's mission is to provide research, product development, and full life-cycle engineering for ammunition, weapons, sophisticated fire control, explosives, and propellants; and pollution-prevention technology. TACOM-ARDEC supports a \$1.4 billion annual program at Picatinny, including key program executive officer and program manager customers, and directly oversees a \$600 million program for life-cycle materiel research, development, and acquisition efforts.

TACOM-ARDEC's most significant FY99 technical accomplishment was development of the Explosively Formed Penetrator and shaped-charge warheads that are currently yielding a 500-percent increase in penetration capability and a 400-percent increase in area lethality in selectable multimode and multitarget configurations. Two other significant technological breakthroughs in FY99 were the transition of the world's first environmentally friendly "green" propellant into the Modular Artillery Charge System and the successful synthesis of the octanitrocubane explosive molecule that promises to be a source of unprecedented explosive energy.

To accomplish its mission, TACOM-ARDEC has state-of-the-art world-class facilities and equipment. These include the Armament Technology Facility; the Advanced Warhead Development Facility (dedicated May 15, 2000); and the Armaments Software Engineering Center.

TACOM-ARDEC's quality work was achieved through comprehensive management that included use of integrated product teams, peer reviews, a systems measurement

review, program reviews, and a customer satisfaction program. In fact, more than 700 TACOM-ARDEC employees were recognized by external customers in FY99. Three times previously, TACOM-ARDEC received RDO of the Year Awards (1986, 1995, and 1999) and RDO Awards for Excellence (1996, 1997, and 1998).

Army RDO Of The Year—Small Laboratory Category

The winner selected for the *RDO of the Year Award—Small Laboratory Category* was the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD), Aberdeen Proving Ground, MD. Applying cutting-edge technology, state-of-the-art training techniques, and partnerships with the private sector, USAMRICD made significant advances in developing medical countermeasures to chemical warfare agents (CWA) and training medical personnel in the management of chemical casualties.

To provide the warfighter with medical countermeasures to CWA, USAMRICD determined the mechanisms and neurochemical events by which nerve agents induce a unique seizure state that is refractory to standard clinically used anticonvulsants. In addition, USAMRICD identified a more rapidly and longer acting drug to control seizure activity, and potent, centrally acting, anticholinergic drugs to control nerve agent-induced *status epilepticus* (SE). USAMRICD also initiated a new program to identify compounds capable of preventing or reducing nerve agent-induced brain damage.

The incapacitating effect of exposure to vesicating agents such as sulfur mustard (HD) has been a concern for U.S. troops for more than 50 years. Recently, USAMRICD scientists identified major mechanisms underlying the vesicating action of HD and developed a research strategy to address these mechanisms. This strategy led to the identification of the first drugs showing significant efficacy in reducing HD injury. Among these are protease inhibitors that protected a mouse ear from HD-induced lesions and synthetic corticosteroids and antibiotics

that protected a rabbit cornea from HD-induced damage. A topical skin protectant (TSP) that serves as a physical barrier to blistering agents was also transitioned to advanced development and approved by the Food and Drug Administration. More recently, the institute made advances in developing a *reactive* TSP that serves not only as a barrier cream but is capable of detoxifying both vesicating and nerve CWA.

USAMRICD was also cited for conducting an award-winning, live, multiday satellite broadcast: *Medical Response to Chemical Warfare & Terrorism*. Approximately 2.5 million viewers worldwide watched this broadcast, and nearly 40,000 participants received continuing medical education credits for this training.

Army RDO Award For Excellence—Large Laboratory Category

The recipient of the *RDO Award for Excellence—Large Laboratory Category* was the then U.S. Army Missile Research, Development, and Engineering Center (MRDEC), a major element of the then U.S. Army Missile Command (MICOM), Redstone Arsenal, AL. MRDEC provided the technical expertise to enable the Services to be smart buyers and users of missiles, rockets, unmanned vehicles and their unique command and control systems, directed energy weapons, non-lethal technology, computer resources embedded in battlefield automated systems, and related models and simulations. (Note: subsequent to the period of performance for these awards, the U.S. Army Aviation Command and MICOM merged to become the U.S. Army Aviation and Missile Command. Simultaneously, the Aviation RDEC and the Missile RDEC merged to form the Aviation and Missile RDEC (AMRDEC).)

During the period covered by the award, MRDEC focused on improving the affordability, survivability, and lethality of Army weapons. Most noteworthy was MRDEC's development of technologies that will revolutionize close-combat operations. Specifically, in FY99, the first successful flight of a tactical missile using a gel-propulsion system was achieved. By using the energy management properties of this system, MRDEC quadrupled an experimental missile's range above that of a currently deployed missile with the same size and weight (i.e., a Tube-



Army RDO Award Ceremony attendees shown left to right are Dr. A. Michael Andrews, Deputy Assistant Secretary of the Army for Research and Technology; COL James A. Romano Jr., Commander, USAMRICD; Michael Devine, Technical Director, TACOM-ARDEC; Paul J. Hoeper, ASAALT; Dr. William C. McCorkle, Director, AMRDEC; COL Edward M. Eitzen, Commander, USAMRIID; and Dr. Walter F. Morrison, Director for Research and Laboratory Management, Office of the ASAALT.

launched, Optically-Tracked, Wire-guided missile). Additionally, a critical digital guidance link was demonstrated that gives the essential features of automatic target recognition, battle damage assessment, and alternate targeting capabilities after missile launch. These achievements are associated with MRDEC's Future Missile Technology Integration Program. This program is paving the way for development of a common missile that is multimission-oriented, multiplatform-compatible, and capable of attacking multi-targets.

MRDEC was also recognized for demonstrating a 99.6-percent improvement in the accuracy of the Multiple Launch Rocket System via a reduction in the circular error probable from 500 meters to 2 meters. This effort was achieved with an 88-percent reduction in rockets, an 86-percent reduction in logistics burden, and an 84-percent reduction in total cost.

Army RDO Award For Excellence—Small Laboratory Category

The recipient of the *RDO Award for Excellence—Small Laboratory Category* was the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), Fort Detrick, MD. USAMRIID is DOD's lead facility for conducting research to develop medical countermeasures against biological threats and naturally occurring diseases of military importance that require special containment. USAMRIID also trains health care professionals in the medical management of

biological casualties, supports other agencies through its reference resource capabilities, provides its unique medical expertise to those responsible for U.S. bioterrorism preparedness efforts, and supports disease outbreak investigations throughout the Nation and the world.

Under the oversight of the Joint Vaccine Acquisition Program and the Joint Program Office for Biological Defense, USAMRIID has made several key advances in the development of vaccines to address biological threats. In particular, USAMRIID was cited for its strategies to develop infectious clone vaccines, recombinant protein vac-

cines, and multiagent vaccine platforms.

In addition to vaccines and therapeutics, development of diagnostic assays for biological agents is an important part of USAMRIID's mission. The ability to diagnose infections immediately after exposure is critical to determining whether a biological attack has occurred so that treatment may be initiated. The institute is developing state-of-the-art technologies that include reagents, protocols, and devices to support rapid identification of biological warfare and endemic disease threat agents in clinical specimens.

USAMRIID continues to train military and civilian health care providers in the recognition and treatment of biological casualties. USAMRIID's 1999 satellite broadcast, *Biological Warfare and Terrorism: The Military and Public Health Response*, was used to train approximately 18,000 health care professionals at more than 700 CONUS/OCONUS downlink sites.

SUZANNE KIRCHHOFF is a Senior Analyst with Science Applications International Corp. This article was written while she was on a contract assignment in the Office of the Deputy Assistant Secretary of the Army for Research and Technology.

A WAY TO TRAIN DIGITALLY PROFICIENT SOLDIERS

LTC Peter B. Hayes, Dr. Brooke Schaab,
and Dr. Franklin L. Moses

Introduction

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is identifying the best ways to train for digital system competency for the Army. The goal is to meet the Army's transition requirements: produce multiskilled, adaptable, and digitally proficient soldiers who are better able to move to an assignment and support the commander using existing systems.

In Fort Huachuca, AZ, training research at an Army school involved in digitization indicates that exploratory or discovery learning is a powerful method for teaching digital skills to novices. When used in the proper environment with trained instructors, this method improves how well soldiers transfer what they learn to novel situations. The methodology is not new. It has been successfully used in education and business where the workforce is regularly trained in digital technology to become current and stay competitive.

What Is Exploratory Or Discovery Learning?

In simple terms, exploratory or discovery learning teaches students to focus on real-world problem solving to master specific tasks and functions. Students learn by working with each other, using actual equipment, and listening to almost no lectures. Students solve problems with help from training aids, other team members, and instructors. They gain a better understanding of the material, learn it faster, and retain it longer than with traditional instruction.

What is good training? Typically, people learn best when they are challenged, motivated, and have opportunities to learn and develop by taking initiative. Think about your best learning experience ever. Who was the trainer? Was it your parent, a teacher, a sergeant? What was the environment? Were you at home, work, in the field, or in a classroom? How did the learning take place? Did

someone direct your every move? Were you trying to figure out something that was important to you? Why was this such a great learning experience?

In today's Army, there are many examples of soldiers mastering complex training competencies using a "train as you fight" model. From firing weapons to performing preventive vehicle maintenance, soldiers perform daily duties using this training method. For example, the *Washington Post*, June 12, 2000, discussed exploratory learning in Army Ranger training. Twenty-two captains trained using simulated real-world situations. They honed their skills by using exploratory or discovery learning to train in the way they would fight. Taking this method into the schools is a further extension of such practice. Instructors can teach the same information using the same standards in the time allocated but in a manner more in keeping with use in the field.

As the Army becomes more digitized, imagine some of the training possibilities for soldiers going through Advanced Individual Training (AIT) at the various Army schools around the country. The newest soldiers could be exposed to training that would simulate the actions needed in actual assignments. For example, a young soldier training in his tank at Fort Knox, KY, could transmit a spot report that would be received by an intelligence analyst at Fort Huachuca, who could then relay targeting information to an artilleryman training at Fort Sill, OK. Think of the training value of information flowing through a tactical operations center to a fire support element! It would be done digitally and involve innovative training practices. This is happening now at Fort Huachuca.

Fort Huachuca's Experience

The U.S. Army Intelligence Center (USAIC) at Fort Huachuca, with assistance from ARI, is investigating exploratory learning for junior-level soldiers and digital sys-

tem users. Preliminary indications show that AIT enhances digital skills training. At USAIC, junior-enlisted soldiers receive advanced individual training to become intelligence analysts (military occupational specialty (MOS) 96B10). As part of this training, they are expected to learn how to operate and refine analysis skills on the remote workstation (RWS), part of the All Source Analysis System. The RWS is a computer system that receives digital information, allows it to be manipulated, and displays it on a computer screen.

Traditional Learning

In a traditional training environment, the instructor uses lectures to explain what 96Bs need to accomplish with the RWS as well as its importance. This highly detailed and time-honored approach tells each 96B the necessary knowledge and information to perform the tasks. A traditional training environment focuses on an instructor delivering a set training program on how to operate the RWS. This program may or may not be linked to the other tasks the 96Bs must perform to take advantage of the systems' functionality. For example, can a 96B, using the RWS, successfully assist in the targeting process of the fire support element?

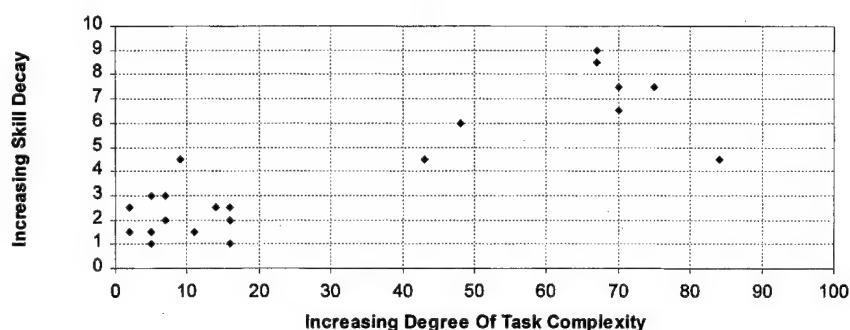
The benefit of using the traditional method of instruction is that a great deal of information is delivered to many soldiers in a very short time. Unfortunately, research has revealed a significant problem. Lectures do not result in sustained proficiency in the most difficult and complex tasks. Performance of these tasks degrades most rapidly after a soldier leaves training. As indicated in the accompanying figure, the skills used in accomplishing the most complex tasks decay faster than the skills needed to accomplish the least difficult tasks.

What can we do to increase skill retention? USAIC and ARI found that training with the exploratory or discovery learning method can make a big difference.

Illustrating The Method

The first step with the 96B10s was to deliver basic information, such as powering up and initializing the equipment, where there was no room for error. This was done in a lecture. The course changed rapidly with the principal training time spent on a series of practical exercises (PEs). These PEs emphasized problem solving to accomplish all required tasks including those that were complex and difficult. The PEs built upon each other and prior learning in the course, and 96Bs were encouraged to work in small teams and find innovative ways to use and

Relationship Between Skills Decay And Task Complexity



manipulate data. When one part of the practical exercise was completed, students briefed the instructor and were allowed to move forward at their own pace. No training time was added to the instruction program. Rather, the training time already set aside for traditional instruction was dedicated to the same material using exploratory or discovery learning. The responsibility for learning shifted from the instructor to the student.

Instructor's Role

The instructor's role remains a critical link in student-centered learning. After furnishing basic information, the instructor must coach, make suggestions, and provide insight about how to address difficulties that arise during PEs. The instructor combines subject matter knowledge with positive coaching techniques to shape and dramatically enhance performance. The challenge is to facilitate the learning experience.

Traditionally, the instructor answers questions and provides solutions to soldiers in training. However, that technique does not encourage soldiers to gain experience needed for solving problems. Exploratory learning is different. For example, when a soldier has difficulty framing a problem regarding the danger posed by the enemy, the instructor coaches the student to think through the problem. The instructor says something like, "It sounds to me like you're trying to determine what enemy assets pose the greatest threat to your unit. What are some of the things you look for to determine threat?" This type of coaching helps the student clarify the problem and gather information to solve it.

The Payoff

ARI research indicates that 96Bs who completed PEs using exploratory learning strengthened the connection between training

and how to apply it. Student performance on a novel PE was assessed after traditional instruction and exploratory learning with the RWS. Those using exploratory learning achieved up to 20 percent more accurate performance (determined by the number of tasks correctly performed). The practical exercises improved motivation because they were structured to place the training in a real-world context. Because the 96B graduates were encouraged to work with each other, they developed a sense of team collaboration as they defined and solved problems. This encouraged self-learning, teamwork, and improved memory for skills being developed. The 96Bs can better adapt and transfer their training to the myriad of situations they will face in unit assignments. This becomes a building block for how to apply technology from basic intelligence staff functions to staff operations in the field.

Student comments indicated positive reaction to exploratory learning. The method challenged them and generated strong motivation to learn. By teaming with other 96Bs, the students said that they learned and retained much more information.

Conclusion

Exploratory or discovery learning may not be the best learning method in every environment and MOS. However, it seems almost mandatory for any MOS that requires exchanging ideas, justifications, information, data, and specifications to confirm or refute conclusions. An ever-increasing number of MOSs will require these skills in the Army's transition and the fielding of digital systems. ARI has begun to work with field artillery training personnel on the Advanced Field Artillery Tactical Data System at Fort Sill. The same kinds of digital system requirements are evident there as at Fort Huachuca.

Practical exercises are building blocks of exploratory and discovery learning. They enable soldiers to work as a team while they define problems and develop solutions. This method is not intended to create experts, but rather to be a strong experiential learning foundation for novices. Soldiers are given the opportunity to learn and make mistakes in a safe learning environment. They learn from those mistakes before being assigned to units and deployed around the world. Then, as they gain experience in their unit assignment, they are better prepared to build on the foundation and, at a faster rate, mature and develop into experts who can successfully accomplish Army missions.

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DR. FRANKLIN L. MOSES is a Research Psychologist and Chief of the Advanced Training Methods Research Unit, Alexandria, VA. He currently directs research about how best to train the use of computer-based systems and to deliver training when and where it's needed using network technologies. He has a Ph.D. in experimental psychology from Tufts University and a B.S. in psychology from the University of Pennsylvania. He can be reached at moses@ari.army.mil

ADDITIONAL NPS GRADUATE PROGRAMS OFFERED IN HUNTSVILLE

James M. Welsh

The Director for Acquisition Career Management is pleased to congratulate 16 Department of the Army employees in Huntsville, AL, who were selected for the Master of Science in Contract Management (MSCM 835) and Master of Science in Program Management (MSPM 836) graduate degree programs. The 5 individuals selected for the MSCM 835 Program and the 11 selected for the MSPM 836 Program were all chosen by the Acquisition Education, Training and Experience Selection Board in August 2000 and began their programs in October 2000. Both 27-month programs are offered through the Naval Postgraduate School (NPS), Monterey, CA, and sponsored by the Army Acquisition Corps.

This marks the first MSCM Program offered in Huntsville and the second MSPM Program offered in Huntsville. The initial MSPM class of Huntsville employees began in October 1999. These students have completed their first academic year in the program and are scheduled to graduate in December 2001 at NPS. An article featuring the first class of MSPM students was published in the November-December 1999 issue of *Army AL&T* magazine.

The names of the selectees (shown in bold type), followed by the name of their supervisor, are as follows:

MSCM 835

Elisa P. Boyer/James M. Snyder.

Boyer is a Supervisory Contract Specialist at the U.S. Army Aviation and Missile Command (AMCOM). She is Level III certified in contracting. Snyder is Level III certified in contracting and has more than 23 years acquisition experience as a supervisor and manager.

***Command
commitment
and supervisor
involvement
are crucial
to the success
of students
participating
in the MSCM
and MSPM
programs.***

Wilma M. Freeman/Robert E. Butler.

Freeman is a Contract Specialist assigned to AMCOM. She is Level III certified in contracting. Butler is Level III certified in contracting and has more than 19 years acquisition experience in leadership assignments at various locations in the acquisition community.

Connie M. Goodwin/William F.

Krahl. Goodwin is an AMCOM employee and is Level III certified in contracting. Krahl is Level III certified in contracting and has more than 15 years of supervisory acquisition experience.

Pamela Milton/Gerald W. Hatley.

Milton is assigned to AMCOM and is Level III certified in contracting. Hatley is Level III certified in contracting and has more than 13 years supervisory and managerial acquisition experience.

Joseph B. Tappel/Willis Epps. Tappel is a Supervisory Contract Specialist at AMCOM. He is Level III certified in

both contracting and manufacturing, production and quality assurance (MP&QA). Epps is Level III certified in contracting. He has a diverse background in acquisition as both a manager and supervisor spanning a career of more than 19 years.

MSPM 836

Ronald E. Chronister/Tony D. Hodgins. Chronister is an Engineer Supervisor assigned to the AMCOM Research, Development and Engineering Center

(RDEC). He is Level III certified in systems planning, research, development and engineering (SPRDE). Hodgins is Level III certified in MP&QA and has more than 25 years acquisition experience in supervisory and managerial positions.

Andrew L. Dobbs/Richard H. Brown. Dobbs is employed at the U.S. Army Space and Missile Defense Command (SMDC) and is certified Level III in test and evaluation (T&E). Brown is currently enrolled in the first MSPM program in Huntsville. He is Level III certified in SPRDE and has more than 20 years acquisition experience in various managerial and leadership positions.

Jerry E. Esquibel/LTC Christopher Little. Esquibel is assigned to SMDC and is Level III certified in T&E. Little is Product Manager, Theater Targets Product Office at SMDC. He is Level III certified in program management and has more than 17 years acquisition experience in management and supervisory positions.

Edward W. Ference Jr./James E. Collier. Ference is employed in the Office of the Program Executive Officer (PEO), Aviation and is Level III certified in SPRDE and T&E, and Level II certified in program management. Collier is Level III certified in program management and SPRDE. He has more than 20 years acquisition experience in both leadership and managerial positions at various locations.

Beverly J. Fuller/Donald W. Griffis. Fuller reports to the Office of the PEO, Tactical Missiles. She is Level III certified in both program management and business, cost estimating and financial management. Griffis is Level III certified in program management and has more than 19 years experience in a variety of acquisition positions.

Margaret F. Haack/James E. Hatfield III. Haack is employed in the Office of PEO, Aviation and is Level III certified in SPRDE. Hatfield is Level III certified in both program management and SPRDE. He has a diverse acquisition background with more than 19 years of leadership and managerial experience.

Scarlett E. Leonard/Manual Jones. Leonard is assigned to AMCOM and is Level II certified in acquisition logistics. Jones is Level III certified in acquisition

By working together to sustain organizational goals and achieve academic excellence, students, supervisors, and organizational chiefs benefit significantly from the "win-win" environment they have fostered together in a common effort.

logistics and has more than 15 years acquisition experience as a supervisor and manager at a variety of locations.

Glenn R. McPherson/Michael Bieri. McPherson works at the AMCOM RDEC. He is Level III certified in T&E and Level II certified in program management. Bieri is Level III certified in MP&QA and has more than 15 years acquisition experience in leadership and managerial positions.

Philip G. Laferriere/Matthew Boenker. Laferriere is employed at AMCOM and is Level III certified in SPRDE. Boenker is Level III certified in SPRDE. He is an experienced leader and manager with more than 25 years acquisition experience.

William S. Pearce/Ronald E. Chronister. Pearce is an Engineer assigned to AMCOM RDEC. He is Level III certified in both SPRDE and MP&QA. Chronister is also a student in the same MSPM program. Chronister is a

seasoned supervisor with more than 15 years acquisition experience in a variety of assignments.

Jerome A. Oelrich/Willie Fitzpatrick. Oelrich works at the AMCOM RDEC and is Level III certified in SPRDE. Fitzpatrick is Level III certified in SPRDE and has more than 19 years acquisition experience in various leadership and managerial positions.

Command commitment and supervisor involvement are crucial to the success of students participating in the MSCM and MSPM programs. Command commitment, for example, demonstrates support for the program and ensures that adequate video teleconferencing learning facilities will be available for scheduled classes. This commitment enables students to participate freely in an educational environment; it promotes learning through student and faculty interaction, and allows for a hands-on, on-the-job application of lessons learned in the classroom. This commitment also creates a backdrop for intellectual discourse through which students can discuss and debate their work and classroom experiences in an academic setting free from operational impediments.

The supervisor's role is no less important to the student's success in the program. The supervisor ensures that the student is fully supported in his or her efforts to balance the demands of organizational responsibilities, academic requirements, and family obligations. By working together to sustain organizational goals and achieve academic excellence, students, supervisors, and organizational chiefs benefit significantly from the "win-win" environment they have fostered together in a common effort.

JAMES M. WELSH is an Education and Training Specialist in the Army Acquisition Career Management Office, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. He holds a bachelor's degree in management from National-Louis University.

CONTINGENCY CONTRACTING IN KOSOVO- STARTING FROM SCRATCH

CPT Mark E. Phillips

Introduction

In April 1999, while an Early Entry Contracting Team (EECT) from the U.S. Army Contracting Command Europe (USACCE) deployed to Albania with Task Force Hawk, USACCE was already finalizing plans to send another EECT to Kosovo to support Task Force Falcon. The second team's mission was to provide critical local contracting support to U.S. troops in the early stages of a permissive to nonpermissive Kosovo entry.

On June 13th, the Kosovo EECT was pre-positioned at Camp Able Sentry in the Former Yugoslavian Republic of Macedonia (FYROM) to prepare for forward movement. When the force entered Kosovo a few days later, an EECT reconnaissance element moved forward to determine what the local businesses could provide. At HQ, Task Force Falcon (Camp Bondsteel), the recon element found only a few tents in the middle of a wheat field, no operating local phone network, and few Kosovars. Calling back to Camp Able Sentry using a tactical phone, one contingency contracting officer (CCO) reported "I think it's going to be a while before we can operate here."

Initial Recon

The initial recon lasted 3 days. A civil affairs team from Fort Bragg, NC, agreed to have CCOs accompany it dur-

ing missions to the Kosovar towns of Gnjilane and Urosevac. Traveling with the civil affairs team proved useful from both the contracting and informational exchange perspectives. The team's translator enabled communication with local officials, while the team's contracting officer helped "win the hearts and minds" of the local populace by contributing to the local economy with local purchases.

During these missions, bakeries and food markets were the only businesses operating. City officials indicated that other businesses would reopen in 2 weeks. Yugoslavian forces had dismantled or destroyed cellular networks and telephone relay stations, thereby making calls between cities impossible. These conditions resulted in having the recon element return to FYROM. The EECT initially provided Camp Able Sentry with commercial line haul and troop transport, heavy cranes for use both at Camp Able Sentry and Bondsteel, and portable toilets for the rapidly increasing numbers of troops in FYROM and Kosovo.

Joint Contracting Center (JCC)

Six days later, the contracting team deployed forward to set up the JCC. For 2 weeks, the contracting team lived and operated out of the 106th Finance Battalion (Forward) detachment. This arrange-

ment allowed an outstanding working relationship to develop between JCC personnel and finance personnel, which is important in any contingency.

The JCC team eventually received a tent from the supply folks and established an office and sleep area just inside the front gate. This gave vendors immediate access to the JCC. Being only 1 kilometer from the main camp area did have drawbacks. Task Force Falcon had no excess generators, so the JCC was without power until USACCE supplied funds to purchase one. Because of a communication wire shortage at Camp Bondsteel, several weeks elapsed before any attempt was made to establish JCC communications.

Despite these challenges, the JCC was able to provide immediate support. Because Task Force Falcon members had to rely solely on Meals, Ready-to-Eat (MREs), the command wanted fresh bread to supplement daily meals. JCC was tasked to find local sources for bread until Defense Logistics Agency subsistence buyers arrived to establish long-term contracts. MAJ Nicholas Vozzo went with a group of soldiers to Gnjilane and Urosevac on a "bread patrol." Bakeries were one of the few businesses open, but all had limited production capacities. MAJ Vozzo established contracts with several bakeries to ensure that each could supply their regular customers as well as



A "bread patrol" in Gnjilane, Kosovo

meet Task Force Falcon requirements. The simple diet addition of fresh bread greatly improved troop morale.

The contracting team continued to educate customers supported by the Task Force on just what the JCC could do for them. Daily reconnaissance with the civil affairs team revealed that some local businesses were opening. When MAJ Dan Rosso, USACCE, and Senior Airman Larry Hubbard, Laughlin AFB, TX, arrived in mid-July, the JCC greatly increased the number of requirements being purchased in Kosovo.

Communications

The JCC was unable to link into the tactical communications network for several weeks because of a continuing wire shortage. A Mobile Subscriber Equipment (MSE) line was finally run to the JCC, but it was promptly cut by the continual road and site construction between the JCC and the nearest signal node. For 2 months, more attempts were made to connect to the MSE network, but those lines were also cut within days. The Camp Bondsteel JCC did not have a dedicated MSE line until telephone poles were installed in September. An Internet connection, standard across the camp since July, was not in place until October. This greatly hindered sourcing and orders to fulfill requirements.

Communications significantly improved in early August when four Iridium satellite phones arrived from the United States. With the hard work of LTC Daniel Hughes, Program Executive Officer for Command, Control and Communications Systems at Fort Monmouth, NJ, the normal 1-2 month process of getting Iridium phone service established was reduced to 1 week. For the first time, the JCC was able to communicate with vendors throughout the United States and Europe. This was particularly useful for numerous IMPAC credit card purchases through U.S. companies. U.S. involvement in Kosovo demonstrated the unreliable nature of cellular phone networks, so a satellite system with telephone and data capability is the standard for future USACCE deployments in austere locations. This capability will provide Internet access (i.e., more vendors) immediately upon reaching the operational area.

The Border

Having goods procured from other countries delivered through the FYROM border became an early deployment challenge. For the first few days, traffic was light and FYROM customs officials passed the commercial vehicles escorted by the Kosovo Peacekeeping Force (KFOR) unimpeded. However, the border situation deteriorated rapidly, and mile-

long traffic backups soon became the norm.

Gravel was purchased in FYROM because muddy conditions at Camp Bondsteel made gravel an absolute necessity early in the deployment. In addition, Kosovo quarries were not expected to operate for several weeks. Despite traffic snarls, a CCO escort ensured the first day's delivery went smoothly. The next day, however, customs officials required export paperwork, which added 5 hours to the procurement time and hundreds of deutsche marks (DM) to the delivery costs. According to FYROM officials, the NATO customs fee exemption applied to imports only. Two days later, green international insurance cards were required to leave FYROM. The cards cost several hundred DM and served no purpose in Kosovo. Within hours of the CCO advising them of this new development, FYROM KFOR officials eliminated this requirement through negotiation.

Despite continuous bureaucratic requirements at the border, the most serious problem was the traffic. The two-lane road from Skopje to the border is narrow and winding. Five days after NATO entered Kosovo, the flow of returning refugees and trucks bringing consumer goods and humanitarian supplies created 3- to 5-mile traffic jams. The gravel convoy was routinely delayed 2-4 hours. The wait would have been longer, but the CCO "bullied" the convoy through. Fortunately, just as the border situation reached its worst, the Camp Bondsteel JCC located an existing Kosovo quarry, which eliminated the need for gravel deliveries from FYROM.

Within a month, 6-hour border delays were the norm. To reduce these traffic jams, FYROM officials eventually had all commercial vehicles heading to Kosovo stage on side roads 12 kilometers from the border. An average of 300 vehicles waited up to 5 days to cross the border. To reduce this border-crossing delay, the JCC began inserting vendors in the daily logistics convoy between Camp Able Sentry and Camp Bondsteel. FYROM officials expedited these convoys from Camp Able Sentry through the

border at a specific time each day. Vendors were charging higher delivery fees because of the delays. This method eliminated those charges while getting needed supplies to soldiers faster.

Improving The Vendor Base

At the start of the deployment, the region lacked a local vendor base. Business owners had either fled to neighboring countries, or inventories had been destroyed or taken by Yugoslavian forces. The JCC quickly educated local businessmen on U.S. business practices. However, cash and commodity shortages in Kosovo made restarting these businesses difficult. While the Prompt Payment Act required payment within 30 days of delivery, 106th Finance and JCC agreed that the hand-to-mouth existence of the local population warranted immediate payment after delivery. Most purchases in the first weeks were made at vendor locations using SF-44, *Purchase Order Invoice Voucher*. With a paying agent from finance accompanying the contracting officer, vendors were paid on a "cash-and-carry" basis. These early purchases gave an immediate boost to the local economy.

Following the bread contracts, the next priority involved obtaining construction material for initial improvements to Camp Bondsteel. Millions of dollars in gravel were purchased from local quarries to reduce border delays and costs, improve roads, and begin camp construc-



On the road to Kosovo (from FYROM), 7 kilometers from the border

tion. Displaying NATO impartiality in Kosovo, the JCC continually searched for Serb vendors. CPT Dave Pinter, 10th Mountain Division, awarded the first contract to a Serbian business for metal boot wash containers. Arriving in September, MAJ Jeff Harrington, USACCE, and MAJ Ed Ottman, Army Materiel Command, established a JCC at Camp Monteith in Gnjilane. With two JCCs operating in the U.S. sector, the vendor base increased almost daily. Some goods could not be found in Kosovo, while other items were sold at unreasonable prices. The JCCs had to procure these goods elsewhere. Despite these challenges, more

than 75 percent of 1999 contracts were awarded to local vendors.

Conclusion

Under austere conditions and with poor communications, initial Kosovo contracting operations proved extremely challenging. The JCCs provided critical support early in the deployment. This improved working conditions and communications, allowing the JCCs to greatly expand the local vendor base and provide improved support to Task Force Falcon. Soldiers deployed to Kosovo can appreciate a higher level of mission and life support as a result of these continuing JCC efforts.

Under austere conditions and with poor communications, initial Kosovo contracting operations proved extremely challenging.

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Boom! Thunder! Crack! The unmistakable sound of an explosive blast pierces the otherwise quiet "computer hub" at the U.S. Army's Yuma Proving Ground (YPG) Ammunition Operations Center. On a computer screen, the M1A1 Abrams Main Battle Tank, located many miles away, visibly quakes as a projectile flies from its jolting, ominous-looking gun barrel.

Via a remote camera on the test site, everything at the gun position is easily visible. Computer instructions tell the camera which way to turn to film the test. Watching the Abrams in a live-fire demonstration on a computer screen, and seeing the software capability that can instantaneously "grab" and make a still digital photo ready for immediate Internet transmission, is truly a remarkable feat. And then, as if that's not enough, firing data stream in at an unbelievably fast pace—literally faster than the flick of an eye. The data streams are instantaneously "data based" for use by engineers via the Internet before the round can impact its target!

But that's just the tip of the iceberg when it comes to detailing the accomplishments of Mark Lauss (who mans the computer station) and his co-workers. Lauss, a computer specialist for YPG's Engineering Division, is quick to admit he couldn't have performed the intense data capture and transmission online without the talented help of many others, some from private industry.

YPG is proud to call itself the Army's premier proving ground and a joint asset for all of America's Armed Forces. Throughout the year, an extremely wide variety of military tests take place at YPG, from helicopter armament tests and long-range artillery tests to parachute and main battle tank tests. Nearly 167,000 rounds were fired at YPG during the past 12 months.

YPG is known for its sophisticated computers that allow engineers to track the progress of each test as it occurs to provide instantaneous feedback. Now it will be able to feature an Internet capability for its customers to view testing online.

Lauss' motto is "have computer will travel." He demonstrated just what that means during a recent conference in Huntsville, AL, where video and data feeds from a live firing at YPG's Red Bluff Firing Range were shown.

"First, the gun goes bang. Immediately, discreet data appear here before the bullet hits its target—in some cases, before the projectile's time of flight is known," says Lauss. The demonstration in Huntsville involved data gathered from the firing of an

YPG SPOTLIGHTS VIRTUAL PROVING GROUND TECHNOLOGY

Marcella Chavez

M1A1 Abrams tank and proved that firing data can be displayed moment by moment. And, by using "push technology" to update Internet databases, this information can be seen in Los Angeles and New York simultaneously.

"It was easy for those watching in Huntsville to understand how this capability will aid Yuma Proving Ground in sending and obtaining information at its hot, cold, and tropical test sites," said Lauss. "We now have a 'window' for seeing into other test environments, testing the same equipment at the same time, and customers can see into this window," he added.

Lauss said that joint testing and remote information distribution via the Virtual Proving Ground (VPG) are the way things are going to be done in the future. Providing a connection for models and corresponding databases will play a major roll in supplying test data to YPG customers, and will ensure its reputation as a vital player in the test community.

Lauss' excitement is refreshing. "I was remotely controlling what the camera was looking at. I was literally acting as test controller and conductor of teleconferencing—not just video, but video and voice. It was great! I did the countdown without disturbing the guys in the field. The folks in Huntsville didn't know where I was, which was good. I could have been showing them a test from Iowa or somewhere other than Yuma Proving Ground," he said.

Within seconds after the tank fired, Lauss provided data on bullets, chamber pressures, the decay of velocities, rates of velocities in flight, initial velocities, and meteorological information. On the computer screen, these discreet events are color coded to make them easier to recognize.

Lauss said it is exciting to see how specific the data transfer process can be. "In essence," continued Lauss, "we validated the process of using the Internet to pass data through the installation's firewall. We proved we could open the firewall for a very specific channel."

Lauss said the last major task would be to encrypt the data to ensure it's safe and secure on its trip. Another feature they demonstrated is that they could immediately see who viewed their information and when.

"It's been a long couple of years working on the VPG. Not many thought we could pull it off, but through teamwork it was done in a relatively short time," said Cindy Sullivan, Operations Research Analyst, and primary point of contact for YPG's Virtual Proving Ground efforts.

Obtaining hardware was the easy part. A stand-alone computer was needed to collect isolated information and pass only selected data to the computer in Huntsville. The demo had to be isolated from the rest of the system. There had to be a stand-alone computer that could collect isolated information and pass only selected data to the Huntsville computer.

It was the security issue that had to be resolved. The installation had to prove it could be selective about sending information to another location.

On the horizon is the coordination of not one but two simultaneous firing tests, in the direct and indirect firing modes. "This is incredible in itself," said Lauss, "but what we'll do is use the wireless Ethernet for transferring test data on the ballistic/vehicle data transfer system." Data out on the range can be sent wirelessly to his computer center. "You see this box and antenna here?" said Lauss, pointing to a box about the size of a large briefcase and a small 2-foot long antenna. "These two devices are fast replacing a whole van full of equipment. We will soon be able to do the same thing using wireless technology. But that is another story all by itself."

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BREAKING THE ACQUISITION PARADIGM: CECOM ACQUISITION CENTER PILOTS ARMY'S E-AUCTIONS

Bob Tiedeman

Introduction

The widening public use of the Internet combined with the proliferation of new Web-based electronic commerce (e-commerce) tools and search capabilities provides consumers instant access to an unlimited marketplace. These same tools and search capabilities also provide the government an opportunity to improve purchasing techniques and reform acquisition processes. With recent revisions to the Federal Acquisition Regulation, the government is now able to reap the benefits of these new tools and the efficiencies of scale provided by the new business environment. In particular, to take greater advantage of this environment, the U.S. Army Communications-Electronics Command (CECOM) Acquisition Center sought to expand the use of its Interagency Business Opportunities Page (IBOP). To accomplish this, CECOM established an Electronic Reverse Auctioning Project Team (ERAPT).

ERAPT's mission is to assess the available software solutions and, where necessary, adapt them for use as state-of-the-art tools for online purchases of sup-

plies and services for the CECOM Acquisition Center's worldwide customers.

ERAPT, which consists of a number of cross-functional experts, began its assessment by seeking an industry partner to pursue a "best-of-breed" commercial solution that could meet its goals. During a period of several weeks, ERAPT evaluated a number of advanced decision-support environments that could expand the use and increase the efficiency of the CECOM IBOP. Compatibility with the IBOP and integration into the Army's Single Face to Industry initiative was deemed critical to the success of this effort.

ERAPT sought a tool that would not only result in a pronounced reduction in acquisition lead times but would also result in the acquisition of a best-valued product, rather than simply a lowest-priced product. To this end, the decision-support environment had to be evaluated on intangibles such as speed of delivery, vendor past performance, warranty period, and other factors determined by the contracting officer, in addition to price.

Software Solutions

After assessing approximately 50 possible commercial solutions, ERAPT engaged Frictionless Commerce Inc. and Moai Technologies, whose software applications promised the "best-fit" solution for the government. Representatives of the CECOM Acquisition Center met and conferred with Frictionless Commerce and Moai Technologies representatives during a period of several weeks.

Frictionless Commerce's Purchase-Source™ and Moai's LiveExchange™ software applications were tailored to meet CECOM's specific needs and then combined to produce a new tool for auctioning. The resultant tool leverages advanced search, comparison and selection technologies, and leading-edge e-commerce functionality to meet CECOM's goals. The tool consists of four distinct components that are available for use by the Army acquisition community. These components are outlined as follows:

- "Spidering" Tool. This tool is based on cutting-edge technology developed at the Massachusetts Institute of Technology Media Laboratory in Cambridge, MA. Essentially, this tool allows Army users to post their required product on the IBOP and identify any "best-value" criteria and performance requirements. When the SEARCH button is clicked, the tool searches Web- and General Services Administration (GSA)-based e-catalogues for products with the same name. The tool then "pulls in" product descriptions and comparison charts. Users can then purchase the product using a credit card or by issuing a contract, as appropriate.

- "Reverse Auction" Tool. This tool allows Army users to post their required product and a "beginning price" on the IBOP. Then, prospective sellers offer their best prices and, as other sellers post their best prices, sellers are induced to reduce their original prices, thus defining the name reverse auction. This tool also permits a variety of auction types such as "Dutch auctions," where Army users post their required product and a "drop-dead"

***Electronic reverse auctioning
is a significant departure from
the static and inflexible process
currently used by the government
to solicit purchase bids.***

delivery date on the IBOP. Then, prospective sellers offer their best delivery dates and, as other sellers post their best delivery dates, sellers are permitted to proffer improved delivery terms. This option is particularly useful in acquiring raw materials or perishable goods where timely delivery to the troops is critical.

- Forward Auction Tool "A." This tool works in essentially the same fashion as the reverse auction tool. However, it allows Army users to search ongoing nationwide auctions so they may benefit from national economies of scale.

- Forward Auction Tool "B." This tool also works in essentially the same fashion as the reverse auction tool. However, it allows Army depots and program managers to dispose of surplus supplies.

Pilot Tests

To date, ERAPT has conducted a number of pilot tests of the new auctioning tool. The first test was conducted May 17, 2000. The initial offering of one Ricoh Secure Fax System, TEMAIR Edgar Utilities software, toner, and ancillary items opened with a beginning price of \$6,891. When the offering closed, the winning competitor offered the Ricoh model to the government for a unit price of \$5,511, which is \$1,380 less than the beginning price!

The second test, conducted May 19, 2000, was witnessed by Dr. Kenneth J. Oscar, Deputy Assistant Secretary of the Army (Procurement), and attended by representatives from Frictionless Commerce and Moai Technologies. This offer-

ing for two IBM notebook computers (or equivalents) opened with a price of \$7,000 each. When the competition closed, the winning competitor offered the Armada E5000 (the IBM equivalent) for \$3,280 each. This price is \$3,730 lower than the beginning price—a reduction of more than 50 percent!

ERAPT and its industry partners continued working to enhance the capability of this new tool so that it could be used for acquisition of military-unique supplies and services. Another pilot to test the enhanced capability was conducted July 25, 2000, for a large number of connector plugs (NSN 5935-01-236-3117), a critical spare part of the Patriot Missile system. Connectec of Colorado and Autodyne of New York participated in this competition, which opened with a price of \$1,180 and represented the government estimate based on recent acquisition history. The auction was vigorous and lasted for nearly 2 hours. In the end, Autodyne offered a price of \$780 each, approximately 33.9 percent lower than the beginning price!

On Aug. 3, 2000, representatives of ERAPT traveled to the Military District of Washington to demonstrate the new reverse auctioning tool. Air Force, Navy, and NASA representatives, as well as personnel from the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, witnessed the demonstration. Three separate auctions were conducted, all in support of the Air Combat Command, Langley Air Force Base, VA. Participation in the auctions

was limited to GSA schedule holders who have demonstrated compliance with Air Force Chief Information Officer mandates.

Conclusion

Electronic reverse auctioning is a significant departure from the static and inflexible process currently used by the government to solicit purchase bids. It offers the potential to save time and money while allowing the government buyer to select items based on their functions, features, and capabilities rather than just their price. Based on initial feedback, industry will also be a beneficiary of this new tool. For example, General Motors, which uses a similar approach, reports that it has cut the cost of processing an order from \$100 to \$10. Other industry representatives also feel that the process is more equitable because it is "out in the open," thus obviating a long-held industry perception that an existing GSA schedule or other government-wide contract vehicle predetermines the selection.

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COST ANALYSIS STRATEGY ASSESSMENT: THE COMPLETE LIFE-CYCLE COST ANALYSIS TOOL

Today's cost-conscious Army is doing everything it can to drive home the point that program managers (PMs) must make Total Ownership Cost (TOC) a high priority during the systems acquisition process. PMs have been given a mandate to aggressively pursue savings throughout their systems' life cycles and to seek cost realism. The operations and support phase of a typical system represents 70 to 80 percent of the overall cost and 75 to 90 percent of the system life. Thus, the most lucrative opportunity for influencing total life-cycle cost occurs during this phase. In addition, because of the greatly extended service lives of weapon systems and end items, this phase offers great potential for major cost savings.

However, life-cycle cost analysis is a monumental challenge for a system in development. Implementing a successful life-cycle cost analysis effort requires an effective automated tool. A thorough life-cycle cost study is complex and virtually impossible without the aid of comprehensive software capable of addressing all cost areas. In addition, the software must have extensive built-in analytical capabilities. This requirement is particularly important for systems in development when trade-off studies are performed. The results of trade-off studies guide the engineering process in terms of cost, performance, schedule, and supportability.

Numerous software models are available for calculating life-cycle cost estimates. Although many of these models are comprehensive, they have typically been designed only to assist the budgeting, finance, and accounting communities. Few of the available models perform supportability-related trade-off analyses. However, the Cost Analysis Strategy Assessment (CASA) model is ideal for conducting such trade-offs as well as sensitivity analyses and comparing different systems and alternative support structures.

The CASA model is a life-cycle cost decision support tool for PMs responsible for materiel acquisition systems. In particular,

Gary McPherson

the CASA model addresses the TOC for the objective system including research, development, test, and evaluation; manufacturing development and production; and the entire operational life during which the system must be supported in the field. Virtually every cost associated with a system is covered by CASA, whether one-time, recurring, or annual.

CASA's flexibility accommodates any tailoring the analyst might need. One great benefit of CASA is that it prompts the analyst to address costs that might otherwise be overlooked (e.g., storage containers, manufacturing test equipment, or recurring training). The CASA model uses numerous validated life-cycle cost equations to compute costs and resource requirements. Users have commented that the algorithms within CASA are particularly useful when developing software and allocating repair parts. Information on algorithms and definitions of the variables used by the CASA model are readily available for the user to review.

Cost models typically have numerous categories where numbers can be plugged in. All models are proficient at totaling up the costs. The advantage of CASA is its extensive analytical capabilities. In addition to calculating life-cycle cost estimates and identifying cost drivers, CASA also performs many types of trade-off analyses. PMs can use CASA to optimize the distribution of spares, conduct reliability growth studies, examine support costs by individual line replaceable units, assist in selecting a warranty approach, and more.

A wide range of sensitivity analyses can also be conducted on the various cost parameters included within the CASA model. With this capability, the user can examine the cost impact of varying factors such as support

equipment availability or the turnaround time for spare parts. The production rate and quantity buy analysis option assists users in determining the optimum quantity of items to procure.

Another one of CASA's most impressive features is the large variety of reports and graphs that can be produced. Report data are presented in an easy-to-understand, spreadsheet format. The CASA user can choose almost any type of chart imaginable for presenting data in an effective, easy-to-interpret manner. The robust CASA life-cycle cost model can consider life-cycle studies for projects that last up to 50 years and accommodate customized maintenance schemes with up to 10 levels. Finally, the online tutorial makes CASA easy for even novice software users.

CASA 2000 is a powerful tool for developing life-cycle cost estimates and gaining a better understanding of the resultant cost figures through trade-off and sensitivity analyses. CASA 2000 has more than 700 registered users throughout DOD and in the private sector. Additional information on CASA, including user training and registration for CASA 2000 software is available on the CASA Web site at <http://www.logsa.army.mil/alc/casa>; by writing to USAMC LOGSA, ATTN: AMXLS-AI, Bldg. 5307, Redstone Arsenal, AL 35898-7466; or by calling DSN 645-9782/9886, (256) 955-9782/9886.

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Introduction

The military is not just the fighting force of the state—it is the mirror of society. The equitable administration of its code of military justice, the impartiality of its merit-based promotion system, and the compassion shown its membership, are the milemarkers of progress in the Armed Forces. When leaders decide to initiate armed hostilities, troop morale becomes the most important operational factor, and that morale is based, in the final analysis, on the evenhandedness and equity of military institutions. And that evenhandedness is undermined by the artificial exclusion of women from jobs that they are capable of performing. Those restrictions erode internal confidence and the operational edge necessary to prevail against a worthy opponent.

Just as the nature of warfare and the warfighter have evolved through advances in technique, so women have found new avenues toward leadership in today's military through technology in general and through information technology (IT) in particular. The global but American-led information revolution has underwritten the so-called revolution in military and business affairs and invests heavily in the unfettered contributions of women. Their support (particularly in the IT milieu), is vital not to fulfill the agenda of liberal politicians, but to secure victory in future armed struggles. For warfighters, this is the acid test—can females make real contributions in future battles—battles that necessarily leverage advanced technology over traditional forms of combat?

According to Lory Manning, Director of Women in the Military Project, Women's Research and Education Institute, there are approximately 200,000 women in the Armed Forces. But the success of the all-volunteer force demands many more female recruits in the future and their complete integration into all areas of the military for which they can qualify. The reason for increasing our reliance on women is simple: The best ideas and the best warriors are indispensable to win future battles. The need is

Reaching For IT . . .

SERVICEWOMEN ESTABLISH TECHNOLOGICAL BEACHHEAD AGAINST SEXISM

J. Michael Brower

operational; nothing more, nothing less. The talent pool that females enrich must be tapped to marshal victory on the technology-dependent battlefields of the new century.

Helping The Nation

The military can help the nation recruit its most important IT labor pool, our females and our youth, by doing its share to stress the following:

- Technical training for women (particularly math- and science-oriented tech training) and avoiding the need to contract out for complex skills;
- Take a queue from the private sector by realigning work schedules to be more compatible with family needs (recalling the origin of all future recruits);
- Adopt a continuous retraining regime as military needs change in the direction of battlefield digitization and IT generally;
- Provide military programs to attract women into hard-to-fill IT and technical positions; and

- Continue to make college-level studies (i.e., the G.I. Bill) a priority both while serving and after departing the military.

How can women be attracted toward IT jobs in the military? While not the *most important* attraction, compensation (including health and retirement benefits) can be in the military's favor. First, the military offers gender equity in pay that is not the rule today in the private sector. According to the Bureau of Labor Statistics, female programmers earned 81 cents for every dollar male programmers brought home in 1998, and female operations systems analysts made about 80 cents for every dollar their male counterparts made. According to the annual salary survey conducted by the SANS Institute of Colorado Springs, female IT workers received smaller raises than their male counterparts last year—10.2 percent vice 12.1 percent for males. According to the 1999 Network World Salary Survey published in July 1999 (<http://www.nwfusion.com/you>), women are victims of an opportunist noblesse

oblige, the same salary-gender gap that is the rule in almost all occupational groups. Women earned an average of 72 cents for every dollar a male made in the categories of senior network executive, local and wide area network management, and in other network management and network staff positions. According to the Office of Personnel Management, women in IT positions nationwide are still making around \$5,000 a year less than their male counterparts. The private sector will eventually overcome these pay differences, but the Armed Forces can take advantage of the disparity to attract military and civil service females and to an extent reduce its servile dependence on contractors.

Other steps to attract females to IT positions in the military and supporting civil service jobs include recommending the end of legalized restrictions on females for jobs they can perform. Offering special signing bonuses and creating entrepreneurial pay differentials for IT specialties will also help to retain needed female talent. Finally, an all-out assault on sexual harassment in all its genres must be launched, as the best recruitable female IT candidates have been infected by negative press on this issue and are correspondingly leery of military service. These perceptions, however, can only be cleansed when top leadership endorses the concept that the only limits on servicemembers should be their ability to handle a given task, regardless of their gender.

What The Future Holds

No one should retain the impression that women are somehow estranged from computers and the associated technologies. Nothing of the kind! Females have made important historical strides in computer development. For example, a woman wrote the first computer program (Ada Lovelace, writing about Charles Babbage's analytical engine in 1843). In her honor, DOD named its software programming language Ada, and that language remains a giant in the Defense industry's automated information system community, the second most commonly

used language after Cobol. During World War II, the code-breaking Enigma machine, used to crack the German's encoded messages to sea commanders intercepting cargo bound for besieged Britain, was often operated by women. Also during the war, though males get most of the credit (the writers of *his-story* defeating history), six women programmed the world's first "computer" built in 1945, ENIAC (Electrical Numerical Integrator and Computer). (Find out more about them at the Women in Technology International (WITI) Foundation Web site at www.witi.org.) Today, women like the Air Force's highest ranking female LTG Leslie F. Kenne, commanding the Air Force Materiel Command's Electronic Systems Center at Hanscom Air Force Base, MA, exemplify the importance of integrating females into the military and into IT jobs as keys to winning wars.

Early in 1999, the U.S. Census Bureau indicated in its *Statistical Abstract of the United States* that IT is the work sector in which women are building their future. There are already 5.6 million more women in IT-related occupations than men, more of them on the upper end of the pay scale than the lower. With the IT and information-related job sectors now making up 55 percent of the U.S. employment picture and knowledge workers bringing home 64 percent of the available "bacon," women are uniquely prepositioned to make remarkable social as well as economic advancements. In addition, according to the Census Bureau, more women are attending college than men (70 percent of women, 64 percent of male 1997 high school graduates). Also, the Internet Advertising Bureau predicted that almost half of the online population would be female in 2000. The U.S. military ignores these trends to its detriment. The paradigm that features women in a central role in IT gives them a closer position to center stage in a military that must master IT to be fully effective.

A Laptop In Every Knapsack!

IT has a natural partner in the feminine ascendancy reflected in western

society and its armed forces since the end of World War I. Western industrial society is pushing the sinews of production further to the east and south, morphing into technocracy before our eyes. Victory in the field, while occasionally encumbered by the bugs embedded in the fruits of IT, cannot be had without the most complex of machinery. Increasingly, women will be the ones who volunteer military units will seek to fight with, and women will be the ones relied on to maintain and manage IT systems. With the end of "front lines," defeated by rapidly advancing technology, sexism in all forms must be abandoned by the victorious militaries of the new millennium. And yet, instead of riding and harnessing the wave, many leaders in and around the military wish to oppose the irresistible alterations demanded by technology-driven changes. To many traditionalist warfighters, the most unpalatable and operationally risky changes concern the female-at-arms. They deny or are blind to the fact that technology is advancing and has redefined the rules of battlespace and paves the way for women to assume leading roles. The fact remains that tomorrow's victories in technology-rich conflicts will be won with women in the vanguard, or they may not be won at all.

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Introduction

As a new system progresses to fielding and then advances toward steady-state sustainment, logistics support goes through a series of changes. The following list describes the typical progression of a system.

- Initial spares are depleted and replacements must be obtained from other sources.
- Design fixes are implemented to correct defects that may show up after testing.
- Technical manuals are updated to correct early publication flaws and to keep pace with hardware and software changes.
- Warranty provisions change from the initial focus on workmanship and material defects to dealing with system failures as a result of design defects.
- As more systems are fielded, military technicians steadily replace contractor technicians in resolving maintenance problems, with less help from the original equipment manufacturer (OEM).
- Sample data collection, which is used early to document fielding and performance problems so fixes can be developed, is slowly phased out. This forces the program manager (PM) to rely on less robust, intra-Service, and joint data collection programs.

When all these changes occur, do the results of good planning kick in, providing a smooth transition to steady-state sustainment? The answer is that more than likely, users and maintainers will encounter a bumpy road during this transition because support plans are not realistically resourced and do not include enough user/maintainer input.

The Tactical Quiet Generator

In March 2000, MAJ Kim Daub, a former Maintenance Officer in the 101st Airborne Division (Air Assault), completed her master's thesis, *Logistics Support Requirements: A Case Analysis of the Tactical Quiet Generator*, at the Naval Postgraduate School. Daub examined an innovative, well-managed program from initial fielding to steady-state sustainment to see how it fared. She specifically chose

TRANSITIONING FROM FIELDING TO STEADY-STATE SUSTAINMENT

COL Michael W. Boudreau (USA, Ret.)

a well-run program that had received Army Materiel Command and DOD awards in 1995 and 1996. Many of the "bumps in the road" that Daub found occur in other programs as well—spanning commodity lines and all Services. Read on to see what she learned—it may sound familiar.

When a new system is approved for production and fielding, there are always loose ends needing to be tied up—there are no perfect programs. Let's look at new equipment fielding from Daub's perspective, that is, as viewed by a field maintenance officer. Note that the Tactical Quiet Generator is still being fielded, and the information below is not intended to reflect the year 2000 program status. This discussion is about *early fielding* and the problems unique to this segment of the acquisition life cycle.

Initial Spares. The initial spares were not the right mix of parts, and the supply system didn't provide them on time. In some cases, wrong parts were stocked because of intricacies in the provisioning model—the Selected Essential Item Stock for Availability Method. Some of the needed parts were not stocked because supply item managers waited until demand for the parts occurred before they were ordered from a contractor. Additionally, spare parts were stocked in insufficient quantities to meet demands during lengthy warranty response times.

Design Fixes. Because of errors in failure prediction rates, some of the parts stocked at the installation level were not

used and were eventually turned in as excess. What happened? It's likely that testing failures were corrected before fielding, but the parts provisioning section was unable to keep up with the changes. As a result of this timing "glitch," some parts were bought and stocked unnecessarily and wastefully.

Warranty Provisions. Warranty timeframes were inconsistent with unit operational tempo (OPTEMPO). In some instances, warranties were expended in only 3 months because OPTEMPO was more intense than planned. After the warranty expired, support came exclusively from the supply system. However, 3 months is too short a time to expect resources to be in place for satisfactory supply support.

Readiness. When warranties were used, they didn't mesh with the needs of the customer. For example, the contractor had 45 days to analyze a component failure and an additional 60 days to complete the repair and return the component to the supply system. At the same time, spares were insufficiently stocked, negatively impacting readiness. Warranty benefit to the using unit was about zero.

Duty Cycles. Equipment duty cycles and system usage were not consistent with the way equipment was designed and negatively impacted readiness. For example, electrical loads placed on generators during field use were often suboptimal and resulted in poor equipment reliability. Unique to generators, you say? It's easy to find examples in other commodity

areas (the M1 Abrams or Family of Medium Tactical Vehicles (FMTV) for instance) where common use (not abuse) resulted in less than optimal reliability or another performance shortfall.

We could argue about the facts of this case. For example, you may want to disagree with some of the things that Daub found or suggest that program constraints forced trade-offs. As a former PM, I tend to make the same arguments. But, I guarantee there was at least one field maintenance officer who didn't think that support to the Tactical Quiet Generator was up to expectations, and I'll bet there were a lot more customers who felt the same way.

Suggestions

The following paragraphs describe some of Daub's suggestions for achieving a smooth transition from fielding to steady-state sustainment. I have taken the liberty of presenting her suggestions in general terms that can be applied across a broad range of programs.

Duty Cycle. I'm starting with equipment duty cycle because help in this area must come from the user community. When equipment passes testing but does not perform well in the hands of soldiers, it's probably the result of a communications failure between the users and the PM. The reasons for this may be because the Operational Requirements Document has not adequately described the operational requirements, the PM and the user representative are not "in synch," user injuries are not involved in the process, or testing is not realistic. Whatever the reason, when the voice of the operator or maintainer is not loud and clear, the Army Training and Doctrine Command must be the unwavering advocate for the ultimate customer—the soldier.

Contractor Logistics Support. Contractors can really be of help while troops are getting used to operating and supporting new equipment. They can teach, mentor, and troubleshoot. They can ensure robust information flows back to OEMs and PM offices by telling contractor and PM teams what's wrong with new equipment and what needs correction. Contractor representatives are usually very

focused, seasoned technicians who are worth their cost. They're needed to assist in reaching steady-state sustainment, and their presence should be planned and budgeted.

I've had very good support from logistics assistance representatives (LARs) and am not criticizing them. However, my experience is that LARs already have too much on their plate and simply do not have enough time to devote to transition issues after fielding. Newly fielded systems require some additional "care and feeding," which is best provided by contractor reps.

Prime Vendor Support. As new systems progress through the changes mentioned at the beginning of this article, users and maintainers could really benefit from more focused parts management. Some contractors are willing to handle spare parts management, and we should be willing to let them do it. They can operate more flexibly than the government. If the production line is "hot," they can respond quickly to crises. Supply chain management techniques can be brought to bear on supply responsiveness through innovative contract arrangements. We should incentivize contractors to achieve rapid response times.

Innovative Warranties. In the past, we often bought assurance warranties and, all too frequently, squandered precious resources on warranties that did not meet customer needs. Now that warranty policy has been modified, PMs should respond with creative, value-added warranties that guarantee contractor performance. There are useful warranty forms that encourage contractors to improve reliability or availability and reduce support costs. We don't need expensive warranties that absorb precious maintenance man-hours, are not executable in field situations, or don't support readiness goals. We *do* need warranties (that are probably expensive, but cost-effective) that are value-added from the customer's perspective and are well thought out to meet customer needs, not the supply system's needs.

Maybe responsive warranties fall into the "too hard" category. If we can't figure out how to write warranties that are

responsive to customer readiness needs, then at least we need to write them in such a way that they don't impede the customer. For example, we might choose only to exercise warranties at the depot level, where, once repaired, the item is returned to the supply system. In fact, reliability incentive warranties *must* be exercised only at depot level.

Combined Support Packages. PMs and contractors today are entering into innovative arrangements that tie together contractor logistics support, prime vendor support (using supply chain management), and innovative warranties. The customer will thank them. Maybe, through integrated product teams, customers themselves (operators and maintainers) have helped develop the more innovative solutions. Or maybe the government has taken partnering seriously and is listening to the innovative suggestions of its contractors.

Conclusion

So, what's the price of innovative field support? I can't prove it, but maybe there isn't an additional cost. In the early 1980s, car manufacturers thought that producing high-quality automobiles was simply too expensive, so they cut back on quality. But, by approaching the job differently, manufacturers discovered that high quality didn't cost more. In effect, quality was "free." Good support might be free, too, particularly when viewed through the lens of total ownership cost. Think about it!

COL MICHAEL W. BOUDREAU (USA, Ret.) is a Senior Lecturer at the Naval Postgraduate School. While on Active duty, he was the PM, FMTV. Boudreau holds a bachelor's degree in mechanical engineering and an M.B.A. from Santa Clara University, California.

FROM THE DIRECTOR ACQUISITION CAREER MANAGEMENT OFFICE

It was hard to imagine in 1968 when the movie *2001: A Space Odyssey* was released that 2001 would arrive so quickly. Our environment has changed and it has mandated that the Army change as well. In fact, with the rapid transformation of the Army into a more responsive and deployable force, it may be difficult in a few years to envision what today's environment was like. Members of the Army Acquisition Corps (AAC) and Army Acquisition Workforce (AAW) are key to the success of this effort, and we are *making it happen* in 2001.

I hope that many of you had the opportunity to attend the annual meeting of the Association of the United States Army in October 2000, stop by the AAC exhibit "Make It Happen," and visit the Acquisition Career Management Office's career-counseling suite. By the time you read this, the AAW 2001 briefings will be well underway. This is an opportunity for you to hear firsthand from senior acquisition leaders about where the AAW is today and how we are *making it happen*. Check the AAC home page at <http://dacm.sarda.army.mil> for details about the next briefing scheduled in your region.

We have a number of career management programs to focus on in 2001. We hope to expand the Acquisition Career Experience Program, which focuses on recruiting exceptional college students into acquisition positions throughout the Army. I also want to emphasize that we are well into the fourth year of the successful Competitive Development Group Program. Additionally, I want to mention that the regional Acquisition Education, Training and Experience Program provides each region with training and experience opportunities geared specifically to the needs of that region. Contact your Acquisition Career Manager or regional office to find out more about these career-enhancing programs.

I would like to direct your attention to the article on additional Naval Postgraduate School programs offered in Huntsville, AL, on Page 20 and the article on sabbatical opportunities for demo project participants beginning on this page.

By the time you read this letter, COL Frank Davis will have taken over as the new Director of the Acquisition Career Management Office. I would like to take this opportunity to formally welcome him. I know that he looks forward to addressing you in the next issue of this magazine.

Sandy Long
Acting Director
Acquisition Career
Management Office

Sabbaticals Offered To Personnel Demo Participants

Participants in the DOD Civilian Acquisition Workforce Personnel Demonstration Project now have the opportunity to take sabbaticals to advance their professional development and ultimately improve the effectiveness of their organization. Prior to implementation of the demo project in March 1999, sabbaticals were limited to Senior Executive Service members. One of 11 demo project initiatives, sabbaticals will allow employees to acquire knowledge and experience through various approaches, including training with industry; work assignments in government, industry, and academia; and conducting technical or managerial research.

Approval authority to implement this demo initiative rests with the head of each agency or organization, or his or her designee. In addition, each agency or organization will fund and administer its own implementation of the initiative and develop procedures for selecting participants. Only demo project employees with 7 or more years of federal service are eligible to be considered.

Sabbaticals can last from 3 to 12 months, and the only constraint of the demo project is that they must contribute to an organization's mission and the employee's professional development. The head of each agency or organization can, however, specify other constraints, such as frequency of sabbaticals and requirements for a continued service agreement. This will ensure that local requirements and training policies are met.

Last year, the Program Executive Office for Command, Control and Communications Systems (PEO, C3S) approved the first sabbatical under the new demo initiative. Arthur Santo-Donato, Project Manager, Field Artillery Tactical Data Systems, submitted an application in March 2000 to participate in an academic sabbatical at the Naval Postgraduate School in Monterey, CA. He outlined the following objectives in his application:

- Develop curriculum for the first-ever doctorate-level degree program in systems acquisition;
- Teach graduate-level classes in systems management and systems acquisition; and
- Instruct Fort Monmouth, NJ, personnel enrolled in Naval Postgraduate School distance learning programs.

The PEO, C3S pay pool panel reviewed Santo-Donato's application. As a result of the review, a new application form was devised to include a post-utilization plan and continued service agreement. In addition, PEO, C3S instituted two application "windows of opportunity," Jan. 15 and July 15, to allow C3S employees to compete against one another. Santo-Donato resubmitted his application addressing the benefits to be derived from his sabbatical, and his application was approved by Pay Pool Manager BG (now MG) Steven W. Boutelle. Santo-Donato began his 10 1/2-month sabbatical Aug. 20, 2000.

CAREER DEVELOPMENT UPDATE

For more information on sabbaticals or other personnel demo initiatives, contact your activity's human resources office (HRO) or Jerry Lee at 703-604-7027, DSN 664-7027, or leeja@sarda.army.mil.

The preceding article was co-authored by Kim Kostek, Management Analyst, HRO, PEO, C3S; and Jerry Lee, a Senior Analyst with Science Applications International Corp., who supports the Acquisition Career Management Office relative to the demo project.

CDG Program Develops Leaders For The 21st Century

As you may have read in the November-December 2000 issue of *Army AL&T*, the annual Competitive Development Group (CDG) Orientation hosted by the Acquisition Career Management Office (ACMO) was held Aug. 8-9, 2000, in Springfield, VA. This orientation provided a forum for members of CDG Year Groups (YGs) 97, 98, 00, and 01 to interact with their colleagues, gain information on Army Acquisition Corps initiatives, and familiarize themselves with the policies and procedures of the program. The orientation culminated with the first-ever commencement ceremony honoring the initial CDG graduates, YG97.

The 3-year CDG Program is designed to develop civilian acquisition leaders for the Army of the future. Upon selection to the program, CDG members leave their regular assignments and are placed on the Army Acquisition Executive Support Agency's Table of Distribution and Allowances (TDA). This allows CDG members the opportunity to enhance their experience and gain valuable training without encumbering their original TDA position. Throughout this 3-year period, CDG members are provided cross-functional experience and training opportunities as well as extensive training in leadership skills and techniques.

The initial CDG members (YG-97), who were competitively selected from among 700 applicants, have completed the CDG Program and are either promoted or placed into permanent positions.

To ensure there are appropriate and sufficient experience opportunities for future CDG members, the ACMO is requesting your assistance. In particular, a formal letter requesting developmental assignments for CDG Program participants has been distributed to numerous organizations. Please review your requirements to determine if a CDG member could be assigned to your organization to gain experience and receive training. A variety of developmental assignments are required. These

assignments can vary in length, encompass any acquisition career field, and be within a project or program management office or in a major Army command. Additionally, these assignments can also be event-driven, encompass routine functions of an organization, or involve special projects of a specified duration.

For additional information, contact Maria Holmes at DSN 664-7113, (703) 604-7113, or holmesm@sarda.army.mil.

ACE Program Invites Participants

The Acquisition Career Experience (ACE) Program, a 2-year pre-intern summer employment program sponsored by the Army Acquisition Career Management Office (ACMO) in partnership with the U.S. Army Materiel Command, was piloted last year with James Madison University.

The intent of the program is to recruit exceptional college students with multidisciplinary backgrounds into Army acquisition positions. The program had a very promising launch, with students working in several organizations in the Washington, DC, and Fort Monmouth, NJ, areas. Because of the success of the initial small pilot group, the ACMO plans to expand this program and partner with other schools.

ACE Program participants receive invaluable work experience while organizations benefit by receiving quality personnel who learn about the latest technology in the business world. The ACE Program is a win-win strategy for all parties involved. As such, the ACMO invites your organization to participate in this valuable program by offering summer positions to these students. Your organization will compete with others in the local region for these new ACE positions. Students are hired as GS-04s for the first summer and are promoted to GS-05s for the second summer. These students are candidates for replacing the aging workforce of the Army Acquisition Corps.

There are a limited number of funded positions available. If you are interested in this valuable program, consider funding a position within your organization. The ACMO will be responsible for the logistical and administrative details of student recruiting and selection. Participating organizations will be responsible for handling all personnel actions, in-processing, assigning a mentor for each student, and for providing challenging tasks. For further information, contact Janet Jones, Acquisition Career Manager (ACM), National Capital Region, at DSN 655-1052 or (703) 805-1052, or e-mail her at jonesj@aaesa.belvoir.army.mil; or contact the ACM in your region.



New AAC Exhibit Unveiled At AUSA

The Army Acquisition Corps (AAC) exhibit at the Association of the United States Army annual meeting, Oct.16-18, 2000, drew more than 2,000 visitors. The exhibit focused on the role of the Army Acquisition Workforce in making the Army's transformation a success. For the second consecutive year, the Acquisition Career Management Office (ACMO) provided career development guidance and counseling in a suite adjacent to the exhibit. The ACMO was assisted in this task by Acquisition Career Managers and other career professionals from the U.S. Total Army Personnel Command. Shown above accompanying the exhibit are support contractors Roosevelt Ingram from Camber Corp. and Cindy Stark from Science Applications International Corp.

CAREER DEVELOPMENT UPDATE

UPCOMING DEPARTMENT OF THE ARMY SELECTION BOARD DATES

Army Selection Board

Colonel/GS-15 Project Manager/Command
Competitive Development Group
Acquisition, Education, Training and Experience
Experimental Test Pilot
Lieutenant Colonel Promotion
Senior Service College
Major Promotion

Projected Convene Date

Jan 17, 2001
Jan 27, 2001
Jan 27, 2001
Feb 5, 2001
Feb 27, 2001
Apr 3, 2001
Apr 17, 2001

Army Selection Board

Colonel Promotion
Competitive Development Group
Acquisition, Education, Training and Experience
Experimental Test Pilot
Lieutenant Colonel/GS-14 Product Manager/Command

Estimated Release Date of Results

Dec 2000
Mar 2001
Mar 2001
Mar 2001
Apr 2001

Important AMB Web Page

For the latest career information from the Acquisition Management Branch (AMB), U.S. Total Army Personnel Command (PERSCOM), go to the AMB Web page on PERSCOM's Online Web site at <http://www.perscom.army.mil/OPfam51/ambmain.htm>.

This Web page provides information on preparation for promotion and command selection boards, training opportunities and educational programs, current positions available to military officers, recent selection board results, phone numbers and e-mail addresses for the AMB staff, and links to other acquisition-related sites.



LESSON 4



**"Don't be afraid to challenge the pros,
even in their own backyard."**

Learn from the pros, observe them, seek them out as mentors and partners. But remember that even the pros may have leveled out in terms of their learning and skills. Sometimes even the pros can become complacent and lazy. Leadership does not emerge from blind obedience to anyone. Xerox's Barry Rand was right on target when he warned his people that if you have a yes-man working for you, one of you is redundant. Good leadership encourages everyone's evolution.

IMPORTANT NOTICE

If you are an individual who receives *Army AL&T* magazine and you have changed your mailing address, do not contact the *Army AL&T* Editorial Office! **We cannot make address changes regarding distribution of the magazine.** Please note the following procedures if you need to change your mailing address:

- Civilian members of the Army Acquisition Workforce must submit address changes to their Civilian Personnel Advisory Center (CPAC).
- Active duty military personnel must submit address changes to their Military Personnel Office (MILPO).
- Army Reserve personnel must submit address changes to the U.S. Army Reserve Personnel Command (ARPERSCOM) in St. Louis, MO.
- National Guard personnel must submit address changes to the Army National Guard Acquisition Career Management Branch at **perkindc@ngb-arng.ngb.army.mil** or call DSN 327-7481 or (703) 607-7481.

Your attention to these procedures will ensure timely mailing of your magazine.

FROM THE ACQUISITION REFORM OFFICE . . .

Rapid Improvement Team Develops Innovative Contract Incentives

Note: The point of contact for the following acquisition reform article is Monti Jaggars, (703) 681-7571, monteze.jaggars@saalt.army.mil.

DOD's Change Management Center is conducting a rapid improvement campaign to develop innovative contract incentive provisions for use in future DOD procurements. DOD and industry are involved in thousands of business relationships each year. All too often, however, the factors that motivate one party to succeed in a business relationship are not fully understood by the other party.

Mutual understanding of the fundamental business relationship underlying a particular contract and its specific incentives can motivate both the government and industry to achieve contract performance results. Contract incentives that can be tailored for each business relationship are sparse, and the use of commercial-style contract incentives is correspondingly narrow. To address this shortfall, the Deputy Under Secretary of Defense for Acquisition Reform and the Director of Defense Procurement partnered to initiate a rapid improvement team (RIT) engagement, Oct. 4-5, 2000, at the Defense Systems Management College, Fort Belvoir, VA.

Team members, nominated by senior leadership based on their involvement and domain expertise, included organizational representatives from the Office of Federal Procurement Policy, the Office of the Secretary of Defense, military Services, other Defense agencies, and industry. In addition, functional experts from program executive offices, installation management officers, finance and accounting offices, and contracting officers were included on the team.

The RIT addressed policy, financial, and program issues associated with three specific contract incentives: share in savings (SIS), fast cash, and tournament contracting. Additionally, the RIT developed the framework for these innovative incentives with guidance for their application, draft administrative processes, and sample contract language that can be tailored to future contracts. Through the RIT's efforts, metrics were also developed to assess overall effectiveness of the identified contract incentives. A summary of these incentives is provided in the following paragraphs.

SIS

A SIS incentive encourages contractors to apply ingenuity and innovation to complete the work quickly and efficiently and share in the savings attributed to their planning and execution.

Target of Use

- Best used when return on investment is big enough to make this a viable business proposition for the contractor.
- Shifts the risk from government to contractor with commensurate opportunity for contractor reward for successful performance.
- Requires partnership approach between government and contractor because of risks involved.
- Allows contractor to apply ingenuity and innovation to efficiently deliver the requirement instead of dictating the government-preferred approach.
- Fixed-price contracts place emphasis for results in schedule and program costs on contractors if they wish to increase profits.
- Performance incentives can be added for particularly critical areas.
- Types of SIS situations are *revenue enhancement*, where an agency seeks to enhance revenue by collecting taxes or user fees; *cost avoidance*, where an agency wants to reduce a net expenditure by cutting the cost of an operation, and the government automatically shares in any savings; and *agency reward contracts*, where an agency wants to reduce a net expenditure and keep the savings for its own use.
- SIS contracts can also guarantee no fee, promising payment only when benefits result from the contractor's efforts. The offeror pays upfront costs and gets nothing for failure.

Elements of Use

- Must be able to establish baseline and methodology for calculating benefit pool. The baseline and methodology *do not* need to be perfect as long as there is advance notice of the baseline and methodology, contractor buy-in, and consistent post-award application.
- The government identifies a monetizable benefits pool that successful contract performance will achieve. The benefit pool may be "on-budget" (e.g., reduced operations and maintenance spending or reduced spare-parts procurement) or "off-budget" (e.g., improved system performance, decreased down-time).
- The government then pays the contractor an agreed-upon portion of the monetizable benefits earned under the contract. In a 100-percent SIS contract, the contractor's entire payment is a percentage of benefits realized. Alternatively, the contractor may be paid a base fee or profit plus a (smaller) percentage of the benefits.
- In a reinvestment variation, there can also be an election by the contractor to reinvest all or part of that savings into the product, program, or service. In that event, the contractor's contribution is matched by the government at a specified share. The effort is subject to mutual agreement between the parties, but the sharing is pre-established as a part of the incentive plan.

Pros

- The government pays only for results; a level of effort isn't enough.

ACQUISITION REFORM

- The incentive contributes to affordability from the standpoint of developing initiatives that would reduce overall instant contract or program life-cycle costs.

- Allows the contractor to decide whether savings are taken as profit or reinvested with the benefit of an added portion from the government. If reinvested, the contractor has an opportunity for product enhancement that might not otherwise have been funded. The result could provide an improved product or competitive advantage for the contractor in future competitions.

- Contractor strongly incentivized for results and penalized for poor performance—the better the results, the higher the payment to the contractor. At the extreme, the contractor is not paid at all if the contract achieves no benefits for the government.

- Contractor incentivized to deliver “A” team and innovative solutions to problems.

- Focuses the government on results, not process.

Cautions

- The government and the contractor must agree if there is a decision to reinvest.

- The financial mechanics may be difficult to arrange because of comptroller process issues and current appropriation laws.

- May be difficult for small businesses to participate as primes (this form of contract may often require upfront contractor investments that are paid back only during out-years).

Fast Cash

Using this incentive, the government conveys the desired outcome to the contractor in terms of performance and/or cost. Contractors convey minimum expected return and the basis for such. The government and contractor then partner in developing the price and payment terms that best meet each party's expectations.

Target of Use

Should be considered for use when funds available to government may not be enough to cover anticipated price using normal contracting procedures.

Elements of Use

- Uses cash flow to drive faster performance and/or lower total price.

- Requires an open, trusting relationship between parties.

Pros

- Can lead to a contract that will have the greatest chance of successful performance.

- By speeding up cash flow to contractor, the government may execute contract at a lower price. This could make an unaffordable acquisition more affordable.

Cautions

- Requires successful collaboration and open communication.

- Cultural impediments may make implementation difficult.

- Motivations of each party must be clearly understood.

- Pricing arrangement may require higher authority approvals.

Tournament Contracting

Competition is structured as an auction and prototype competition, with the winner awarded a “prize” for the best product. Auction component consists of participants paying a fee for entering the tournament, which could be used to defray the cost of the prize or offset the cost of conducting the competition.

Target of Use

- Research and development, and

- Opportunities for commercial application of the developed product.

Elements of Use

- Government commits to paying the research tournament winner a prize.

- Selection of winner is based on specified priorities established by the government and included in the Request For Proposal.

- Quality of design is most important.

Pros

- Promotes innovation by offerors.

- Provides firmer cost estimates for equipment because costs would be based on completed hardware versus conceptual hardware estimates.

- Prototype can be evaluated and its uses clarified before production dollars are committed.

- Supports thrust toward modeling and simulation of new systems.

- Requires less government oversight because the offeror has already developed the item and is offering it at a fixed price to the government.

- Contractors can specify within their proposal what they consider to be appropriate rewards or fees for alternative or additional performance goals.

Cautions

Determining the prize requires careful consideration and evaluation:

- Award level must be based on value to the government.

- Award level must be based on a formula.

- Award level must incorporate other determinants.

LETTERS

Sirs:

As Deputy Director of the Army Research Laboratory's Vehicle Technology Directorate, I lead the propulsion-related R&D [research and development] activities jointly undertaken by the Army and NASA at the Glenn Research Center [OH]. Naturally, I was delighted when I saw the cover of the September-October 2000 issue of *Army AL&T* and eagerly anticipate a growing role of joint Army/NASA work at all three NASA S&T [science and technology] sites: Ames, Langley, and Glenn. I'm afraid that's where the rub is. In reading the Acquisition Executive's column on the inside cover, which I always do very carefully, I couldn't help noticing that in the fifth paragraph, where the collocated activities were cited, the activity at Glenn was unmentioned. I can't overemphasize how sensitive an issue that is at Glenn, both on the Army and the NASA side, as it would be at any of the collocated sites. The fact is, Army and NASA researchers at Glenn are playing a very significant role in the M&S [modeling and simulation] thrusts that comprise the new collaborative initiatives. Therefore, I feel bound to point out the omission in the column, inadvertent as I'm sure it is, and small as it may seem. For the new initiative to really get started right, it's incumbent on us, the Army, to be very sensitive to cultural issues with our new (but not really new) partners. Though Langley is lead, the M&S thrusts will ultimately span work across the other NASA centers, including Glenn, and a unity of purpose roles must be respected. For this reason, and it's really a shame, I'm reluctant to disseminate this issue—I just know all 52 Army people here at Glenn will pick up on the omission and probably share their observation with their NASA colleagues. It's a

shame because other than that, it was a very fine column and issue (just as in "other than that, how was the play Mrs. Lincoln?").

Thank you for your attention to this concern.

**Diligent Reader and Loyal Army Employee,
Robert C. Bill**

Army AL&T Response:

Dear Mr. Bill:

Thank you for pointing out the significant M&S role being played by Army and NASA researchers at the Glenn Research Center. As you know, the Army/NASA partnership's focus on SMART [Simulation and Modeling for Acquisition, Requirements and Training] and ISE [Intelligent Synthesis Environment] initiatives is in its initial phase. Just as Mr. Goldin indicated, we must take time to build a solid foundation, set up the partnership correctly, and move out. Both agencies are "getting acquainted" and discovering the extent of potential for sharing technology and expertise.

Regarding the organizations mentioned in the Army Acquisition Executive column, there was no intent to imply that these collocated organizations were the sole extent of partnership activities occurring throughout the Army and NASA. The intent was to highlight the wide array of challenges and endeavors engaged in by the Army and NASA and describe how they are putting the SMART and ISE concepts to work for better solutions.

We look forward to hearing about Glenn Research Center's work in future issues of *Army AL&T* magazine or, perhaps, at the co-sponsored SMART Conference next April.

NEWS BRIEFS

Army Research Lab Shares Two SBIR Quality Awards

The Army Research Laboratory (ARL) is sharing two 2000 Small Business Innovative Research (SBIR) Quality Awards with industry partners Production Products Manufacturing and Sales Inc., St. Louis, MO; and Cree Inc., Durham, NC.

Working with Dr. Bruce Fink of ARL's Weapons and Materials Research Directorate, Production Products developed a capability to measure the interior rate of strain on lightweight composite vehicular armor during ballistic attack. This was accomplished through the combined use of fiber-optic recording, high-speed demodulation, ballistic testing, and composite materials. This capability will help the Army design more survivable armor for soldiers and their equipment.

With the assistance of Dr. Kenneth Jones of ARL's Sensors and Electron Devices Directorate, Cree developed the powerful High Electron Mobility Transistor (HEMT) for use in high-efficiency solid state amplifiers. HEMT has produced record power densities and X-band efficiency. This technology will benefit current and future DOD communication systems and is also commercially applicable in radar, cellular base stations, and microwave satellite communications.

Congress initiated the SBIR Program in 1982 to increase business participation in federal research and development (R&D). Army SBIR research efforts encompass three phases. Phase I is the

feasibility study, which lasts up to 6 months and is funded for up to \$70,000 with a \$50,000 option available. Phase II is R&D, which can last up to 2 years and is funded up to \$730,000. Finally, Phase III involves commercialization, which is funded by the private sector or by non-SBIR Program sources.

The annual Quality Awards Program recognizes Army SBIR Phase II projects for technical achievements, contributions to the Army, and dual-use commercialization potential. Each year, a panel of Army and industry experts selects the winning projects from more than 100 candidates. ARL has won 7 of the 38 Quality Awards presented since the program began in 1994.

For more information, contact Dave Davison at (301) 394-2302, or e-mail ddavison@arl.mil.

TEC/TRAC-WSMR Employees Receive Outstanding Achievement Award

Dr. Paul Krause and Louis Fatale, employees at the U.S. Army Corps of Engineers' Topographic Engineering Center (TEC), and Danny Champion, an employee at the U.S. Army Training and Doctrine Command Analysis Center-White Sands Missile Range (TRAC-WSMR), NM, are recipients of a DOD Modeling and Simulation (M&S) Outstanding Achievement Award. The TEC/TRAC-WSMR team members were presented the award by Dr. Delores Etter, Deputy Under Secretary of Defense for Science

and Technology, who recognized them for their highly innovative, unique, and comprehensive study titled *The Effects of Vegetation on LOS for Dismounted Infantry*.

Prediction of line-of-sight (LOS) conditions is an essential part of understanding the battlefield. Consequently, in August 1997, the Army M&S Office provided funding for a study that would result in a better understanding of LOS in vegetated areas and enable a more accurate depiction of dismounted infantry engagement in combat simulations.

The study identifies representative worldwide vegetative density zones, verifies and validates typical LOS within each, predicts LOS performance by providing analysts a standard algorithm to yield accurate LOS in varied vegetation densities, and provides recommendations on how to improve simulation of LOS in vegetation areas for combat models.

New GPS-Based Hydrographic Navigation System

A new global positioning system (GPS)-based hydrographic navigation system has been developed that eliminates tidal uncertainties of hydrographic surveys in coastal areas. The Real-Time Kinematic GPS Tides system was developed at the U.S. Army Corps of Engineers' (COE) Topographic Engineering Center

(TEC), Alexandria, VA. Initially implemented in the Saint Mary's Entrance Channel in the Jacksonville, FL, COE District, this system is the only technique approved for use in contract dredging operations in the channel. TEC is pursuing a patent for this dredging technology.

System inventor Brian Shannon is licensed both as a professional engineer and a land surveyor in the Commonwealth of Virginia. He holds a B.S. degree in civil engineering from Old Dominion University.

TEC's Brown Receives Patent

The U.S. Patent and Trademark Office recently granted a patent to Roger O. Brown, an employee at the U.S. Army Corps of Engineers' Topographic Engineering Center (TEC). Brown received the patent for his invention titled *Method for Rigorous Reshaping of Stereo Imagery with Digital Photogrammetric Workstation*. This method allows a more rigorous stereo imagery sensor model to be handled with a simpler mathematical model of aerial vertical frame photography. It can be used by a larger user group and provides better exploitation of stereoscopic data.

A physical scientist at TEC, Brown has a wide range of experience in the research, development, test, and evaluation of soft-copy mapping methods with digital imagery and terrain data.

BOOKS

PM 101: According to the Olde Curmudgeon

By Francis K. Webster Jr.,
Project Management Institute, 2000

**Reviewed by LTC Kenneth H. Rose (USA, Ret.),
Tidewater-Richmond Area Manager for WPI in Hampton,
VA, and former member of the Army Acquisition Corps.**

Among the many project management books currently available, few provide a concise, practical summary that serves both beginners and old hands. *PM 101: According to the Olde Curmudgeon* is a new addition to the literature that does just that.

PM 101 arises from a series of articles originally published in *PM Network* that have been expanded and improved throughout time. The book addresses defining and planning projects as well as essential project management skills. *PM 102*, a follow-on book due out in 2001, will address areas of scheduling, resources, cost, risk, reporting, and control.

Webster's down-to-earth style speaks directly to those who must get things done. Throughout the book, he presents examples from the Mars Pathfinder Project that show how concepts apply in the real world.

The book begins by differentiating projects from other modes of work. A discussion of modern project management follows that explains how today's methodologies differ from previous practice or other forms of management. A concise summary of the nine project

management knowledge areas in the *PMBOK® Guide*, which is now recognized as a U.S. national standard, concludes this section of the book.

Webster defines three dimensions of managing a project: technical, leadership, and administrative. He addresses each fully in separate chapters. Technical skills are important, especially in smaller projects where the project manager (PM) may have a significant technical performance role. As projects become larger, responsibilities expand and leadership and administrative skills become more important.

Scope management receives complete coverage that includes initiation, planning, definition, verification, and change control. Webster suggests that a good way to deal with uncertainty is to conduct a scope review at the end of each project phase. Good scope management will result in fewer disputes, higher customer satisfaction, and reduced PM stress.

Discussion of the work breakdown structure logically leads to a comprehensive review of network diagramming that includes essential conventions for graphics, notations, and computations. Webster transitions smoothly to planning techniques, misconceptions, and best practices.

PM 101 is an introduction to basic concepts. It will not make a PM from scratch. It provides a firm foundation that will serve well in professional growth. For more experienced individuals, it provides a benchmark and a view of the forest for those who may have become too closely focused on the trees.

This book is available for \$34.95 from Project Management Institute at <http://www.pmibookstore.org>.

The Project 50 (Reinventing Work): Fifty Ways to Transform Every "Task" Into a Project That Matters!

By Thomas J. Peters, Alfred A. Knopf,
New York 1999

Reviewed by LTC John Lesko (U.S. Army Reserve), Senior Analyst and Group Facilitator with ANSER, a public service research institute in Arlington, VA. Lesko is a frequent contributor to Army AL&T and a member of the Army Acquisition Corps.

Tom Peters' influence in managerial circles is legendary. During the late 1970s and early 1980s, in collaboration with Robert Waterman and Nancy Austin, he co-authored two books: *In Search of Excellence* and *A Passion for Excellence*. These books offered plenty of "how-to" advice to business managers wrestling with global competitors who were either outproducing or beating us in manufacturing quality automobiles and/or electronic appliances. These works also sparked discussion among senior Defense officials who, in the wake of the Vietnam conflict yet much before Desert Storm, were looking to emulate America's "business best practices." *Liberation Management: Necessary Disorganization for the Nanosecond Nineties*, *The Tom Peters Seminar*, *The Pursuit of Wow!*, and *The Circle of Innovation: You Can't Shrink Your Way to Greatness* followed these best sellers and rounded out the 1990s.

Today, the prolific Tom Peters offers the *Reinventing Work* series to kick off the 21st century. Reading *Project 50* is an excellent way for acquisition professionals to learn about what some have called a manifesto for today's white-collar revolution. With the advent of the Internet, knowledge management, business-to-business transactions, and other forms of electronic commerce, today's project management environment is truly changing. Members of the Army Acquisition Workforce will benefit from reading Tom Peters' latest work if only to stay current on what seems to be today's emerging best practices and management buzz.

Peters breaks a Wow Project into four stages: *create*, *sell*, *implement*, and *exit*. Along the way, the reader can choose from a list of 50 ideas. The number of ideas is not equally divided by stage. In fact, the greatest number of ideas is found under the creative stage of project management. As for the structure of this book, each chapter lists a new idea. The "nub" of each idea is presented in clear, straightforward language. True-to-life examples from a number of industries and firms illustrate each point. "Things to do" (TTD) are located at the end of each chapter.

A sample of best practices or TTDs that this reviewer finds particularly appropriate for the acquisition community includes:

"Always volunteer to be the (1) note-taker, (2) the to-do list creator/manager, (3) the meeting organizer. Nobody wants these jobs – and yet they turn you, instantly, into [a] de facto project manager."

"Invite three freaks – a freaky customer, a quirky academic researcher, a miscellaneous cool-freak person in your Rolodex – to evaluate the revolutionary aspects of your project."

"Create your own ... Wow Project Web site ... Invite one or two local 'web gurus' to lunch to review your project plan and give you (bold-unflinching) Web input."

"Live ... eat ... sleep ... breathe: prototype! ... A culture of rapid prototyping is the ultimate marker of any innovative organization."

Readers of *Project 50* will learn new tricks—or at least gain a new perspective—as they follow Peters' suggestions and steer their programs, projects, and tasks along the pathway to "Wow-ness." And since Wow Projects are defined as those that the project team will brag about 5 years from now, what better metric for acquisition professionals working to transform today's Army into tomorrow's pre-eminent land force.

More reserved or conservative managers may choose other business references for their professional libraries. However, project managers who see to shake up mundane assignments—and there are plenty of such assignments in the military—will find many original, easy-to-implement ideas in this guide. *Project 50* is a timely and useful work in the era of transformation. Add this title to your must-read list today.

CONFERENCES

Aviation Materiel And Logistics Transformation Symposium

The Army Aviation Association of America and the U.S. Army Aviation and Missile Command will cosponsor the annual Joseph P. Cribbins Product Support Symposium on Feb. 21-23, 2001. The theme of this year's symposium is Aviation Materiel and Logistics Transformation.

The purpose of the Product Support Symposium is to stimulate dialogue among industry executives, senior government officials, and military leaders regarding how Army aviation will contribute to achieving the Army's transformation in the areas of materiel acquisition and logistics. The symposium will focus on emerging insights into sustaining, modernizing, and retiring the Army's aviation fleet.

For further information regarding the symposium, contact Kim Daniel of AEPCO Inc. at (256) 464-9191, or e-mail daniel_kimberly@aepeco.com.

ARMY AL&T WRITER'S GUIDELINES

<http://dacm.sarda.army.mil/publications/rda/>

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Purpose

To instruct members of the AL&T community about relevant processes, procedures, techniques, and management philosophy and to disseminate other information pertinent to the professional development of the Army Acquisition Workforce.

Subject Matter

Subjects may include, but are not restricted to, professional development of the Army's Acquisition Workforce, AL&T program accomplishments, technology developments, policy guidance, information technology, and acquisition reform initiatives. Acronyms used in manuscripts, photos, illustrations, and captions must be kept to a minimum and must be defined on first reference. **Articles submitted to *Army AL&T* will not be accepted if they have been scheduled for publication in other magazines.**

Length of Articles

Articles should be approximately 8 double-spaced typed pages, using a 20-line page, and must not exceed 1,600 words. **Articles exceeding 1,600 words will not be accepted.** Do not submit articles in a layout format or articles containing footnotes or endnotes.

Photos and Illustrations

A maximum of 3 photos or illustrations, or a combination of both, may accompany each article in a separate file from the manuscript. Photos may be black and white or color. **Illustrations must be black and white and must not contain any shading, screens, or tints. All electronic files of photos must have a resolution of at least 300 dpi (JPEG or TIFF). If they do not meet this requirement, glossy prints of all photos must be submitted via U.S. mail, Fedex, etc.** Photos and illustrations will not be returned unless requested.

Biographical Sketch

Include a short biographical sketch of the author/s that includes educational background and current position.

Clearance

All articles must be cleared by the author's security/OPSEC office and public affairs office prior to submission. The cover letter accompanying the article must state that these clearances have been obtained and that the article has command approval for open publication.

Offices and individuals submitting articles that report Army cost savings must be prepared to quickly provide detailed documentation upon request that verifies the cost savings and shows where the savings were reinvested. Organizations should be prepared to defend these monies in the event that higher headquarters have a higher priority use for these savings. All Army AL&T articles are cleared through SAAL-ZAC. SAAL-ZAC will clear all articles reporting cost savings through SAAL-RI.

Submission Dates

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July-August	15 April
September-October	15 June
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Submission Procedures

Article manuscripts (in MS Word) and illustrations/photos (300 dpi JPEG or TIFF) may be submitted via e-mail to bleicheh@aaesa.belvoir.army.mil, or via U.S. mail to the address in the first paragraph at the top of this page. All submissions must include the author's mailing address; office phone number (DSN and commercial); and a typed, self-adhesive return address label.

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